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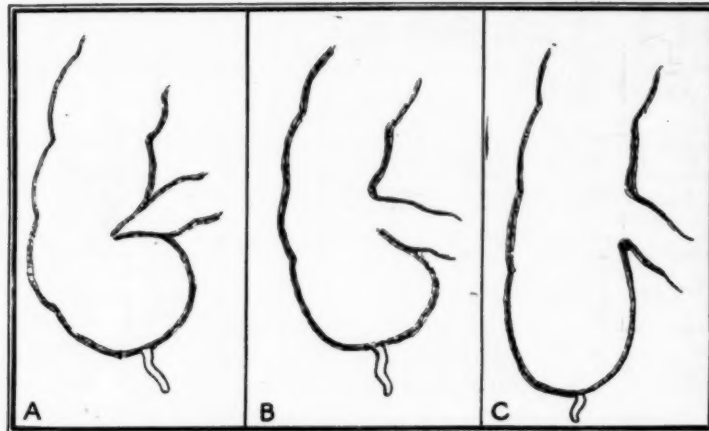
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The Pathology of the Sympathetic and Vaso-Motors

HENRY WINSOR, M.D.,
Haverford, Pa.

Physiology of Sympathetics and Vaso-Motors

The sympathetic goes to smooth muscle fibre wherever found causing it to contract (1). All smooth muscle fibre and all glandular structures are supplied with power to act through the vegetative nerves (2). These nerves are given the chief, if not the entire control, of metabolism (3). P. Castellino and N. Pende mention the trophic influence of the sympathetic directly on anabolic and catabolic activities—also an indirect influence through vaso-motors—on the quantity of nutriment appropriated by the tissues, as well as on development (4). The nutrition of all tissue is controlled by the spinal ganglia. The afferent path of the sympathetic regulates by reflex path, the trophism of the vegetative organs—and can also transmit unconscious or subconscious impulses in health and disease (5). It has been customary to ascribe to the sympathetic a certain trophic function, it seems more proper to ascribe this nutritional control to its vaso-motor function by means of which it determines the blood-supply to the various parts (6). It can be seen that symptoms on the part of organs are disturbances in normal physiological equilibrium, and are closely connected with stimulation of these nerves (7). The vegetative nervous system then, when its normal action is disturbed, is the chief cause of the symptoms of disease (8).

Ischemia and Venous Congestion Preceding Organic Disease

The pathology of nutrition is logically co-extensive with pathology for every pathological condition is fundamentally a nutritive one (9). The blood is usually spoken of as the nutritive liquid of the body (10). All conditions which modify the constitution of the blood or its distribution are liable to produce tissue change. In most instances the blood supply or the blood itself is altered in the direction of deficiency (11). Meigs gave many illustrations of a microscopic pathology of blood vessels, proving that many acute diseases of organs are preceded by chronic pathological changes in their nutrient vessels, the viscera becoming later diseased through impoverishment of their blood supply (12). Lapinsky

EXPLANATORY NOTE

This paper consists of a series of citations correlated under suggestive sub-headings from the original with exact references cited, the material being found in the library of the College of Physicians of Philadelphia, and the object being to furnish a perspective on the literature as found in the second largest medical library in the world and for convenience of research workers.

accepts degenerations of vaso-motors as the cause of changes in the vessel walls, changes in the vessel walls may cause changes in these nerves (13). Warthin, however, demonstrated experimentally that removal of the vaso-constrictor influence accelerates, while removal of the vaso-dilator influence retards inflammatory reactions (14). As F. Darwin suggests, this may depend upon whether the inhibitor or the constrictor fibres of the vaso-motor nerves are most affected (15). For example, we cannot imagine a vascular condition which is without its effect upon the renal epithelium, and can hardly imagine an alteration of the renal epithelium, which does not depend upon change in the blood vessels (16). Codivilla cites cardiac, pulmonic, pleural and gastro-intestinal diseases due to interference with the nutrient vessels supplying the organs which later become diseased. Through compression of the circulation of the lung, the veins especially become disturbed, through malnutrition the parenchyma loses its natural resistance and readily becomes attacked by germs, thus giving rise to bronchitis, pneumonia, and tuberculosis (17). The vaso-motor system deserves careful consideration as a cause of respiratory, gastro-intestinal and genito-urinary disturbances as well as in their treatment. The close affiliation between the brain, the endocrine and chromaffin and vaso-motor systems must be kept in mind (18).

Of the General Association of Diseases of the Organs With Diseases of Sympathetics and Vaso-Motors

"We have observed in many chronic affections of the spinal cord, that the internal organs, which are animated by the sympathetics atrophy slowly (19). Many anatomists particularly Lobstein and Duncan, have determined that the sympathetics are susceptible of hypertrophy, when the organs to which they are distributed hypertrophy, or become attacked by accidental production infiltrating their tissues (20). Inflammation of the spinal cord is often followed by inflammation of the kidneys in sheep (21). Majendie did an autopsy on a dog in which the eighth pair of nerves (as the vagus was called) was cut, the lung on that side had undergone alterations preventing respiration (22). Dupuytren after doing the same experiment found no atrophy. Bichat, however, after frequently examining the sympathetic in diseases of heart, liver, stomach and intestines, has observed pathology of the sympathetics in but two in-

stances: once in cancer of the stomach, a thick gland with semi-lunar ganglion denser and larger than normal it was the size of a nut and cartilaginous. Duncan in one case of diabetes, found the lumbar and sacral sympathetics tripled or quadrupled in volume (23). The action of the vaso-motor nerves may be deranged by disease of the spinal cord (24). The irritability of the spinal cord depends on the maintenance of the normal circulation (25).

Cerebro-spinal Diseases Associated with Diseases of Sympathetics

Hemicrania is described as caused by disease of the sympathetic system by Du-Bois (26). According to Bruner migraine and epilepsy are so caused (27). Migraine is due to an affection of the cilio-spinal region of the cord (28). Hysteria; (29) hysterical fever, epilepsy and reflex paralyses are sympathetic disturbances according to Rosenthal and Briguet (30). Von Graefe, H. Schmidt and others state that glaucoma neuro-retinitis and ophthalmia neuro-paralytica are sympathetic disturbances (31). Bruner has written that facial hemiatrophy is caused by disease of the sympathetic (32). Gia Vulpian noted arrest of development of the face in young animals operated on the sympathetic of one side (33). Brown-Sequard e Dupuy, Arloing, Bidder, Mobili, Morat, Doyen and Cihavonic observed in animals with resection of the sympathetic in the cervical region, cerebral, osseous, muscular and cutaneous atrophy of the operated side (34). Progressive muscular atrophy is a sympathetic disturbance, according to Sir Charles Bell, "It must still be the influence of the sympathetic nerve which produces it" (35).

Cerebro-spinal Diseases in Which Microscopic Pathology of the Sympathetic System Has Been Demonstrated

According to Schneevogdt and Jaccoud fatty degeneration and atrophy of the sympathetics are found in progressive muscular atrophy (36). While "Rammolimento cerebrale" (four cases), "Ictus apoplectico per hemorhagica," meningo-myelitis tubercular (37), dementia precox, senile dementia, hyponchondriasis (38), hydrophobia, polineuritis, spinal meningitis, insular sclerosis, tabes dorsalis, and locomotor ataxia combined with disease of the sympathetics have been cited (39).

Endocrinous Disease and Disease of Sympathetics

The endocrinous glands are stimulated by the sympathetics (40). Embryology and comparative anatomy—indicate this association of the sympathetics and endocrine glands (41). The Thyroids are activated by the sympathetics according to Ord, Hector MacKenzie and Graves (42). The sympathetic is activated by the thyroid (43). The thyroid (in exophthalmic goitre) is not primarily diseased, but affected through disturbances of the sympathetic (44). In exophthalmic goitre—Wilson found degenerative changes in the superior cervical ganglia in all of thirty-one cases examined microscopically. According to Ochsner exophthalmic goitre may be due to an infection of the cervical ganglia of the sympathetic (45). Operations upon the superior cervical ganglion of the sympathetic for the cure of exophthalmic goitre caused in about equal numbers some to be better, some unaffected, some made worse, according to Jonnesco and others.

According to Cushing, Weed and Jacobson, stimulation of the sympathetic nerve supply of the posterior lobe of the hypophysis cerebri, (Pituitary body) may be a possible cause of diabetes (mellitus) (46). Cyon and Adloff state, "Section of the sympathetic high up (cephalad) causes glycosuria, section of the sympathetic low down (caudad) causes polyuria and albuminuria (47). Adrenal glycosuria, may be caused by excessive adrenal stimulation of the sympathetic (48). Blum

showed that injection of adrenalin produced glycosuria, which according to Langdon Brown is a pathological exaggeration of a physiological function (49). "Diabetes is produced by paralysis of the sympathetic nerves (50).

Many examples of Addison's disease associated with pathology of the contiguous sympathetics are cited by Eulenburg and Guttman, also by Laignel-Lavastine, on the other hand many of Addison's disease in which the sympathetics were unaffected were also cited or quoted (51).

Diseases of the Heart and Its Sympathetics

Report of an autopsy of a patient with cardiac arrhythmia. The right phrenic showed dark blue, with chalky knots on it; the junction of the great cardiac nerve with the cardiac plexus enlarged to the size of a hazel-nut, branches of the left vagus surrounded by lymphatic enlargement (52). At necropsy, pathology of the sympathetic has been observed in cases of prolonged asystole (52). The treatment of auricular fibrillation by quinine and its derivatives is interesting because of the known effect on vaso-motor nerves (53, 54). According to Giovanni pathology of the sympathetics has been found in twenty-one instances of cardiac affections (55). Pio Foa found fibrous atrophy, hyperemia, sclerosis, fatty, pigmentary and amyloid degenerations with accumulation of colorless blood-corpuscles and micrococci in the blood vessels of the sympathetic system, quite constantly in cardiac affections (56).

Diseases of Lungs with Diseases of Their Sympathetics

The following instances of diseases of the lungs with disease of their sympathetics have been cited: (F. H. Pottenger, op. cit.) pulmonitis one (57); pleuro-pneumonia (58); pleuro-pneumonia in thirty necropsies (59); acute broncho-pulmonic tuberculosis in four; chronic pulmonary tuberculosis in two; acute tuberculosis in four and combined with splanchnic nerve disease, hypoadrenalism and cancerous cachexia in one. Di Giovanni cited tuberculosis with disease of the sympathetic system in twenty-nine autopsies (59). Pia Foa found fibrous atrophy, hyperemia, sclerosis, pigmentary, fatty and amyloid degeneration with accumulation of colorless blood corpuscles and micrococci in the blood vessels of the sympathetic system quite constantly in tuberculosis (56).

Gastric Pathology with Pathology of Sympathetics

Lobstein found the semilunar ganglion extremely red and inflamed in pregnancy, case dying in the fifth month of pernicious vomiting; the splanchnic was thicker and larger than normal. He found similar alterations in Coqueluche, (pertussis) with spasmodic vomiting (60). Autenreith, in the same affections found the vagus and sympathetic affected (61). Bichat in cancer of the stomach found a thick gland pressing on the sympathetic supplying the stomach, in another the semilunar ganglion was denser and larger (than normal), in another it was nut-sized and cartilaginous (62). Other researches of Bichat of the sympathetic were negative for disease (62). In a case of cancerous diathesis tormented by continuous colics, M. Rayer found on the cadaver profound alteration of many sympathetic ganglia, independent of the tuberculous and encephaloid lungs (63). "The presence of these tuberculous ganglia appears to coincide with mucous of the stomach" (presumably mucous gastritis) (64). Rubinato found disease in the sympathetic ganglia of the stomach in diseases of the latter (65). D'Amato e Macri found chronic gastritis with sclerotic gastric ganglia (66). Rubinato has demonstrated chronic gastritis associated with sclerosis of the gastric ganglia (67). Surgen found

disease of Meissner's and Auerbach's plexuses in atrophy of the stomach and intestines (67½).

Intestinal Pathology with Sympathetic Pathology

Pinel describes cholera as a trisplanchnic affection (68). Bichat wrote "There are some colics independent of all local affections, serous, muscular or mucous, that are essentially nervous, residing in the nerves of the semilunar ganglia, which traverse all the course of the abdominal arteries" (69). Lobstein has observed a similar alteration in many instances of lead colic deaths (70). Another autopsy showed a case of sclerosis of the solar plexus of tuberculous origin (71). Pathology of the sympathetics was demonstrated by Laignel-Lavastine, in typhoid-fever at necropsy (72). Also in ten autopsies on typhoid fever by Guizette and in fourteen deaths from typhoid fever in all (73). Sürgen reported diseases of Auerbach's and Meissner's plexuses in fourteen instances of chronic enteritis (74). In scurvy in one instance (75) and in Pellagra (said to be due to protein deficiency) at ten necropsies, with chronic degenerative changes in the vertebral, semilunar and enteric ganglia (76). Disease of the sympathetic has been reported in *tabes mesenterica* with chronic enteritis. Three times at autopsy (77) Rawena reported disease in Auerbach's and Meissner's plexuses in chronic enteritis (78).

Diseases of Liver and Diseases of Sympathetics

Cancer of Gall-bladder with disease of its sympathetics has been reported by Laignel-Lavastine (79).

Rubinato reported one necropsy of acute yellow atrophy of the liver with disease of its sympathetics (80). Lenneck reported one instance of hepatic cirrhosis with chromatolysis of the hepatic sympathetic at autopsy (81). In all seven necropsies of hepatic cirrhosis with disease of hepatic sympathetics have been found reported (82).

Diseases of Spleen and Diseases of Its Sympathetics

Splenic leucemia has been cited as associated with disease of the splenic sympathetics (83). Pio Foa found fibrous atrophy hyperemia, sclerosis, pigmentary, fatty and amyloid degeneration, and accumulation of the colorless blood-corpuscles and micrococci in the blood-vessels of the sympathetics in such diseases as leucocythemia (84).

Peritonitis with Disease of the Sympathetics

Acute perforative peritonitis and disease of the sympathetics in one necropsy (85); *tabes mesenterica*, chronic enteritis and disease of the sympathetics in three instances (86); puerperal peritonitis and disease of sympathetics in six cases at post mortem (87).

Kidney Diseases and Diseases of Sympathetics

Pavy reported a "Diabetes produced by paralysis of the sympathetic nerves" (88). Duncan in one case of diabetes, found the lumbar and sacral sympathetics tripled or quadrupled in volume (89). Lobstein has found the nerves which constitute the supra-renal plexus much denser and thicker in a case of kidneys with tuberculous degeneration and hypertrophy (90). Renal glycosuria is cited as due to sympathetic disease (91). Nine instances of acute parenchymatous nephritis are cited found with disease of the sympathetic (92).

Uterine Disease with Disease of Sympathetics

Six instances have already been cited of puerperal peritonitis with disease of the sympathetics. Neuroses associated with diseases of the uterus, prostate gland lower genito-urinary tract and rectum will be found more fully explained in Byron Robinson's "Abdominal and Pelvic Brain," through the close network of sympathetic relations with many illustrations of remarkable

dissections. (The extraordinary recoveries from various neuroses after treatment of local diseases in the lower genito-urinary and rectal tracts claimed by E. H. Pratt, in his book on "Orificial Surgery," are made comprehensible after reading Byron Robinson's book.)

Toxins Traversing Nerve Trunks

Speaking of Tetanus, A. P. C. Ashhurst says: Toxins are absorbed directly by the nerves of the wounded part, and are transported through them to the spinal cord. If the nerve be divided the toxins will ascend as far as the section, but not beyond (93). Tetanus toxin travels through the nerves from the point of infection to the central ganglion cells. Diphtheria toxin may likewise travel along the nerves. The virulence of hydrophobia and of acute poliomyelitis, also progresses along the nerve trunks (94). Tetanus toxin ascends the nerves (a) by way of the axis cylinders (b) by way of the lymphatic channels of the epi and perineurium (95).

Bacteriology of Vaso-motors and Their Vessels

Pio Foa—quite constantly found fibrous atrophy, hyperemia, sclerosis, pigmentary, fatty and amyloid degeneration, accumulation of colorless blood-corpuscles and micrococci in the blood-vessels of the sympathetic system of such diseases as syphilis, leucocythemia, tuberculosis, cardiac and infectious diseases (96). Others have noted streptococci in the vessels of the ganglia with chromatolysis and vacuolization, especially in small-pox (97).

Diseases of Blood Vessels as Due to Vaso-motor Disease

Lapinsky accepts degeneration of vaso-motor as the cause of changes in the vessel walls; changes in the vessel walls may cause changes in these nerves (98). In constitutional syphilis, in all in which the sympathetic system was examined lesions of the sympathetic, both in nerves and connective tissue were found including colloid and pigmentary degenerations, hyperplasia sclerosis and proliferation of endothelium of blood vessels (99). Enlargement and dilatation of blood vessels, fatty, granular and amyloid degenerations of vessel walls, and an increase of connective-tissues among the nerve cells of the sympathetics and vaso-motors are cited by (100). Laignel-Lavastine observed angioma diffusa in eight and atheroma diffusa in two instances (101); while Pietro Castellino and Nicole Pende found atheroma diffusa in eight and aneurysm in two instances combined with disease of the vaso-motors (102). Raynaud's disease is due—to an abnormal irritation of vaso-motors and tracts (103). Klatz, experimentally has proven that hyperextension alone may cause arterio-sclerosis. After suspending rabbits head down for a definite length of time each day, he found at autopsy well defined sclerosis of the aorta (104). Excessive exercise may cause arterio-sclerosis according to Lorand (105). Arthur V. Meigs has demonstrated histologically that many acute diseases of organs are preceded by chronic disease of the walls of the blood vessels supplying the organs which later developed disease (106).

Lymph Vessels and Vaso-motors

Muscle fibres have been demonstrated in the walls of lymph vessels (107). Nerves and muscle fibres have been demonstrated in the walls of lymph vessels (108). "I have known the flow of lymph to be considerably increased during stimulation" of the sympathetics (109). Stimulation of the lympho-scretory nerve can produce angio-neurotic edema (110).

Brief Correlation of Findings

Although many organic diseases may result through

diseases of the sympathetics, it should not be forgotten that the relationship between the blood, the vessel walls and the vaso-motors is so intimate that distinction between diseases of these three is hardly warranted; they are interdependent. The study of extrinsic affections of the sympathetics, such as pressure effects from exostoses of the vertebrae and ribs and of hypertrophic spondylitis deformans irritating the sympathetic and other nerves and vessels will of necessity be deferred for another occasion.

Treatment Applied Through the Sympathetics and Vaso-motors

General blood pressure is raised by elevation of the foot of the bed in the recumbent position, bandaging the extremities, transfusions, heat, pituitrin, adrenalin, quinin, nux vomica, physostigma, ergot, digitalis, etc.

Reduction of general blood pressure is accomplished by rest in bed, bleeding, amyl nitrite, nitroglycerin, aconite, and veratrum viride.

The effects of heat and cold vary with their application.

Physiotherapy, Zone Therapy, etc.

A continuous stream of impulses are received by the sensory spinal nerves which are transferred to the connector neurons of the sympathetic system and expressed as reflexes in the internal viscera (111). It is a common observation that blood pressures may vary according to the temperature of the surrounding media—and also according to the degree of other physical stimulation which is applied to the sensory cutaneous nerves (112). The fact that peripheral vessels may contract while planchnic vessels dilate indicates that the factors which control the vaso-motor mechanism for different parts of the body differ (113). From the origin of the three great splanchnics (cervical, abdominal and pelvic) it is clear why a blister on the lower part of the back of the neck is so effective in dispelling visceral disturbances (114). The blister inhibits the vaso-motor centers and this soon rights the vascular disturbances in the viscera.

John P. Arnold found that repeated brief pressure along the spinal column arouses the reflex constrictor nerves and brings about a certain amount of contraction in the blood vessels of the skin and muscles of the back in the region treated. It also undoubtedly produced at the same time a certain amount of dilatation of the vessels in the cord. On the other hand continuous pressure along the spine arouses the reflex dilators and brings about a certain amount of dilation of the blood vessels in the skin and muscles of the back, and a corresponding contraction of the blood vessels in the cord and therefore there exists a compensatory relationship between the blood vessels in the cord and those structures supplied by the posterior primary divisions of the spinal nerves (115). Cutaneous areas for influencing the viscera will be found in Abrams' volume on Spondylotherapy (116). Other areas where the sinusoidal current or spinal percussion cause contractions or dilatations of blood vessels and organs will be found throughout the book. The periphereo-viscero-cutaneous zones of Head, "Dermatomes" bear a striking resemblance to areas where treatment is applied to the skin to influence diseases in the organs belonging to the same nerve vascular segments (117). The vaso-motor system is a highly finished mechanism subject to slight stimuli. It deserves careful consideration as a cause of disturbances of the respiratory, gastro-intestinal, genito-urinary any special organs and in their treatment (118).

(1) Piersol in lecture 1920. (2) F. M. Pottenger, p. 50. (3) ditto,

p. 26. (4) Byron Robinson, "Abdominal and Pelvic Brain", p. 18, quoting Marshall Hall. (5) Pietro Castellino and Nicole Pende, "Patologia del Sympatica", p. 66. (6) p. 77. (7) Frederic Erdman, "The Control of the Circulation", quoting the New Encyclopaedia. (8 and 9) F. M. Pottenger, p. 36-30.

(10) Fred. Erdman, "The Control of the Circulation", quoting Lazarus Barlow, p. 437. (11) W. H. Howell, "Text Book of Physiology", p. 415. (12) Erdman, quoting p. 438. (13) Arthur V. Meigs, "Origin of Disease" and "Diseases of Blood Vessels". (14) Erdman, quoting Landois, p. 351. (15) Ashhurst, A. P. C., "Surgery Principles and Practice", p. 27. (16) Ashhurst, John, Jr., "Principles and Practice of Surgery", p. 35. (17) Erdman, quoting Landois, p. 351. (18) Di Alessandro Codivilla, "Sulle Condizioni Viscerali degli Scoliotici Gravi", p. 829-839, and N. Capriolo, "Deformita della Colonna Vertebrale da Rachitismo", also quoting Bachman and Schultess and Bachman. (19) Czar C. Johnson, "The Relation of Physiology to Surgery", Nebraska State M. J., 7, 59, 2 '22, from the International Medical and Surgical Survey, Vol. 3, No. 3.

(20) C. H. Philippe Pinel, "Considerations generale sur L'Anatomie le Physiologie, et les Affections Morbæ du Nerf Grande Sympathique" in his These pour le Doctorat en Medicine, p. 27. (21), p. 55-56. (22), p. 26. (23), p. 42. (24) Same author and pamphlet. (25) W. R. Gowers, "A Manual of Diseases of the Nervous System", p. 290. (26) Frederic Erdman, "The Control of the Circulation", quoting Landois' Physiology.

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Cardiac Efficiency Tests

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It is now generally recognized that the presence of a systolic murmur heard at the mitral or pulmonary valve areas does not necessarily indicate cardiac insufficiency. Examiners or recruits during the late war found that a murmur was not sufficient evidence for excusing men from military service and, likewise, physical directors are well aware that other tests for determining the integrity of the myocardium must be employed before any student is to be excluded from active athletic exercise.

Of course, the blood pressure and the pulse rate, with the subject at rest, may give valuable evidence in addition to the physical examination of the precordium. The electro-cardiograph, when available, will often reveal abnormalities which otherwise would be overlooked.

But for the routine physical examinations of school children, some test showing the effects of exercise upon the heart is to be preferred.

Thus Pembrey and Todd¹ employed as an exercise running up and down stairs. In a well-trained man the pulse rate was doubled, but rapidly returned to normal. In an untrained man the increase in the rate was less and return to the normal was delayed. The pulse was observed over periods of fifteen seconds, for the drop in the rate was very rapid.

Lowsley² gives the number of beats increase in the pulse rate per minute, immediately after various degrees of exercise, as follows:

After moderate exercise.....	26
After rapid exercise.....	33.5
After vigorous exercise.....	44
After fatiguing exercise.....	44.6
After exhaustive exercise.....	54

There is a difference in response to exercise by trained and untrained men, as mentioned above. This was worked out by Schumacker and Middleton³, using 50 running steps as the exercise. The non-athlete shows 33.7 per cent. average increase of pulse rate after this form of exercise. In athletes, trained for major sports, the pulse showed an increase after exercise of only 26.9 per cent. Athletes with a dilated heart gave 35 per cent. increase, while in athletes with dilated, hypertrophied and irritable hearts, there was an increase of pulse of 55.2 per cent.

Middleton⁴ finds that the pulse rate rises rapidly at first with exertion, but does not reach its maximum level as soon as the blood pressure. The fall of the pulse rate after exertion is much less rapid than the blood pressure fall. Occasionally there is a secondary rise of pulse rate.

MrKenzie⁵ states that directly after exercise the pulse may jump to 180 beats per minute, quickly returning to normal in well-trained men. In the untrained, the rate remains high and often irregular for some time, so that the examination of the pulse after a measured amount of exercise affords a ready means of testing the efficiency of the heart to do muscular work.

In a personal communication dated 1917, McKenzie says that "the pulse rate and blood pressure should be taken either standing or lying down, as there is a good deal of data taken to compare the

difference between the lying and standing position. The exercise that I employ is 50 steps of high knee running. This gives a good test and is better than the insurance test of hopping on one foot for 20 feet. The stooping is, I think, less valuable, as it may interfere with the respiration, especially if the patient holds his breath.

"I usually count the pulse for a minute after the exercise and then estimate it in sixths, noting how quickly the rate comes back to normal. For example, the first 10 seconds might give 20 beats (rate 120); the third, 16; the fourth, 14, and the last 12 (rate 72, which would be normal. The rate of the first 10 seconds being taken as the rate after exercise (120)."

Cotton, Rapport & Lewis⁶ used the lifting of 20 pound dumb bells from the floor, to the full stretch of the arms above the head.

If a given amount of work is chosen as a stimulus and applied to normal controls and patients with irritable hearts, the pulse rate rises much higher in the patients than in the controls and the high rate is longer sustained. When more severe exercise was used, the controls averaged a higher rise in pulse rate (76 beats), than the patients (63 beats); this was because the pulse rate of the patients averaged higher before the exercise.

Meakins and Gunsen⁷ employed a walk of 75 paces at ordinary quick time with climbing 27 steps (18 feet) of a form of test exercise. The pulse was counted before the exercise and from a polygraph tracing afterwards.

Parkinson⁸ compared the pulse rate on standing and on slight exertion in healthy men and in cases of "Soldier's Heart." The subject lay recumbent for fifteen minutes before any observations were made. A polygraph was attached to the wrist and a reading taken. Then the subject was told to stand up and the rate recorded for two minutes. He was then sent down 25 steps and made to climb them at a moderate walking pace. On his return, a tracing was taken for three minutes, the subject standing. He then lay down and a final tracing was taken. In twenty normal men the average pulse rate, lying, was 72 and immediately after exertion, 105, while in the soldiers with irritable hearts, the corresponding rates were 77 and 121 respectively.

Brady⁹ believes that a pulse rate remaining more rapid than normal for over three minutes after 15 deep knee flexions should arouse suspicion of the cardio-vascular integrity.

Addis¹⁰ gives the pulse rate standard after using a modification of the regular army test. This was then as follows: The pulse rate is taken with the subject standing. He then lies down and it is counted again; thereafter he hops 100 times on the left foot and the pulse rate is counted immediately and two minutes after the exercise, with the subject lying down, and again fifteen minutes later, and after the subject has stood up again. Addis found the average pulse rate of 1,000 recruits lying down to be 78; standing, 94; after hopping, 107; and two minutes later, 82, or an increase of 29 beats of the rate after exercise over the rate lying down.

In 1921 we¹¹ published the effect of exercise on pulse rate in Chinese subjects. It is our purpose now to analyze these findings.

The following method was employed:

Before exercising the pulse was counted for 30 seconds with subject sitting at a table. Two forms of exercise were employed which we shall designate A and B.

A. Suggested by Dr. A. H. Woods. Subject stoops as low as possible for three times in rapid succession and then remains standing while the pulse is counted for the first ten seconds after the exercise is completed. This multiplied by six gives the rate per minute.

B. Method, suggested by Dr. Duncan Whyte. After taking the normal pulse rate, the pulse is counted after the subject has descended and ascended stairs twenty feet in height.

The advantages of Method A are that it is always possible to employ it, whereas most other methods require special conditions.

In Table I is given a summary of the results obtained by various observers, both of the normal pulse rate in the sitting posture and the rate after Exercise A and B.

TABLE I.

The Pulse Rate of Chinese at Rest and After Exercise "A" and "B."

Age	Ewers			Tootell			Trimble				Whyte			Cadbury				
	Number	At Rest	After Exercise A	Number	At Rest	After Special Exercise	Number	At Rest	After Exercise A	After Exercise B	Number	At Rest	After Exercise B	Number	At Rest	After Exercise A		
6														1	90	108		
7														6	84	103		
8														27	90	111		
9														39	90	112		
10														37	91	111		
11														45	84	104		
12														68	85	108		
13														60	84	108		
14														77	83	107		
15											3	72	107	108	83	107		
16	1	66	100								9	78	97	107	84	108		
17				14	80	113					10	80	104	108	82	106		
18											14	82	112	91	82	106		
19							6	70	94	96	11	76	108	68	82	107		
20											20	81	109	47	78	103		
21				2	84	109					12	81	108	17	82	104		
22											4	85	110	12	81	104		
23														4	78	101		
24	4	76	101								1	88	116	1	60	84		
25							12	73	93	87	1	84	128	1	74	96		
26															1	72	102	
27															1	64	90	
28																		
29																1	88	114
30	4	86	108												1	72	96	
31-40							5	78	103	112					3	76	88	
41-50	2	67	81				1	64		80								

Ewers' cases were patients who had recovered and were from the city of Yeungkong on the seacoast of Kwangtung Province, within the tropics.

Dr. G. F. Tootell reported on 16 school boys from the Province of Hunan in Central China. The form of exercise employed was as follows: The subject ascended and descended a flight of 22 steps of a total height of 3.96 meters (13 feet). The weight of the students varied from 28.58 to 53.5 kilograms (63 to 118 pounds) and their height from 141 to 175 cm.

Dr. C. G. Trimble reported on 24 normal males from Fukian Province. Exercise A was used in

some cases and Exercise B in others. (See Table I.)

Dr. D. Whyte of Swatow studied the effects of Exercise B on 85 normal male students from Swatow in Kwangtung Province. The weights varied from 25.85 to 64.41 kg. (57 to 142 pounds) and the heights from 137 to 176 cm. (54 to 69½ inches). (See Table I.)

The author's data on this subject were taken from healthy male students of the Canton Christian College. All were natives of Kwangtung or Kwangsi Provinces, the great majority coming from the former.

The pulse was counted in 1,180 apparently healthy students, but the records of only 931 have been employed in the present study. The remaining 249 were excluded for the following reasons: Heart murmurs, mostly functional and without subjective signs, 124 cases; ectopic beats and irregularity in heart action, 3; from Provinces other than Kwangtung and Kkangsi or of mixed race, 25; female, 66; errors in count, 28 and pulmonary tuberculosis, 3. The students who were counted were free from all these conditions.

The pulse was counted with the subject seated quietly, the arm resting on a table. The count was usually made for 30 seconds and the result doubled.

The exercise consisted in stooping rapidly for three times and then standing erect while the pulse was counted for the first 10 seconds, and the result multiplied by 6. This form of exercise is simple, can be carried out anywhere and uniformity of muscular effort is as easy to maintain as in any other form of exercise. In step-climbing or in running, the exertion varies considerably, depending on the speed with which the exercise is taken.

It is our belief that this simple form of exercise will reveal a weakened myocardium as accurately as most other forms.

The pulse rates before and after exercise were recorded as a fraction, the numerator indicating the rate after exercise and the denominator the rate at rest.

In Table II are recorded the average pulse rates at rest and after exercise, with the maximum and minimum extremes.

TABLE II.

The Pulse Rate at Rest and After Exercise "A" in Normal Male Chinese Students of the Canton Christian College. Also the Ratio of Increase and the Actual Increase of Beats After Exercise.

Age	Number of Cases	Rate Sitting			Rate After Exercise			Increase Rate Factor	Actual Number Increase of Pulse Beats
		Average	Maximum	Minimum	Average	Maximum	Minimum		
6	1	90	...	...	108	...	...	1.2	18
7	6	84	92	68	105	120	96	1.33	21
8	27	90	124	76	111	156	80	1.23	21
9	39	90	120	54	112	156	72	1.24	22
10	37	91	114	64	111	132	84	1.24	21
11	45	84	128	56	104	160	80	1.25	20
12	68	85	120	64	108	160	84	1.28	23
13	60	84	114	64	108	144	76	1.27	24
14	77	83	124	60	107	138	78	1.29	24
15	108	83	114	60	107	138	66	1.319	24
16	107	84	120	52	108	150	72	1.32	24
17	108	82	120	44	106	132	72	1.297	24
18	91	82	120	54	106	150	84	1.303	24
19	68	82	114	60	107	132	80	1.331	25
20	47	78	102	54	103	132	72	1.334	25
21	17	82	116	60	104	138	72	1.279	22
22	12	81	102	72	104	126	84	1.302	23
23	4	78	90	66	101	108	96	1.301	23
24	1	60	...	...	84	...	...	1.4	24
25	1	74	...	...	96	...	...	1.297	22
26	1	72	...	...	102	...	...	1.416	30
27	1	64	...	...	90	...	...	1.406	26
29	1	88	...	...	114	...	...	1.295	26
30	1	72	...	...	96	...	...	1.333	24
31	2	81	84	78	99	108	90	1.227	18
36	1	72	...	...	78	...	...	1.083	6

A factor was obtained by dividing the pulse rate after exercise by the rate at rest. These factors average from 1.23 to 1.334 for normal young men of ages 7 to 23. The younger children show a smaller factor, as a rule, while over 15 the figure is 1.3 plus.

It is evident that what is desired is the ratio of increase of the pulse after exercise and this ratio is provided in this way.

In order to determine the proportion of cases falling in certain limits, 217 cases were taken at random in ages 6 to 21. In these the following numbers were obtained:

Factor Value	No. Cases
1.00—1.05	8
1.06—1.1	21
1.11—1.15	24
1.16—1.21	22
1.21—1.25	29
1.25—1.3	20
1.31—1.35	19
1.36—1.4	16
1.41—1.45	18
1.46—1.5	17
1.51—and over	23

There was one of 1.888 and the highest was 2.045. This indicates that values varying from 1.06 to 1.555 are common, but the majority ranging between 1.15 and 1.4.

If now a different method of determining the effect of exercise is used, by subtracting the average number of beats at rest, from the average number after the stooping exercise, we get averages for the different ages from 7 to 23 years, varying from 21 to 25 beats or an average of 23 beats increase per minute. (See Table II.) This is slightly less than the average increase obtained by Lowsley (2), (see above), after moderate exercise, such as swimming, tennis, jumping, etc.

Unfortunately, we have not been able to differentiate our subjects according as they were athletic or non-athletic, trained or untrained.

Comparing these averages with Dr. Whyte's after the other form of exercise "B," we find that the increased number of beats for this form is 28 beats or 5 more than the average increase after the stooping exercise. Comparing the increase in rate after the stooping exercise with Shumacker & Middleton's⁸ percentage increase (see above), we find that our percentage is 27 per cent. increase over the resting rate, which is less than that for non-athletics, but practically the same as the rate of increase for athletes with normal hearts.

Summary

A simple form of test exercise is described for determining the functional capacity of the myocardium.

The exercise consists in simply stooping three times. The pulse rate after this is compared with the pulse rate of the subject sitting.

This form of test gives on an average in healthy young men an increase of 23 beats per minute or 27 per cent. increase over the resting rate.

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Pitfalls in the Diagnosis of Retropharyngeal Abscess

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It was my fortune last winter to encounter half a dozen cases of this rather rare affection of infancy and early childhood. Because, four of these cases were wrongly diagnosed, I decided to review the literature of the subject and thus perhaps facilitate early diagnosis and prompt treatment. In order that the reader may understand fully the patho-genesis of this affection, a general review of the gross anatomy of the pharynx is here given.

Anatomic Foreword

The pharynx is a wide musculo aponeurotic canal about five inches long extending from the base of the cranium to the level of the body of the sixth cervical vertebra. Here it passes into the larynx and oesophagus. The nasal chambers and the oral cavity empty in the pharynx anteriorly whereby three distinct divisions are formed: epi-pharynx, meso-pharynx and hypo-pharynx respectively. The epi-pharynx or naso-pharynx lies behind the nose and above the level of the soft palate. In front it communicates through the posterior nares with the nasal fossae. On its lateral wall is the pharyngeal orifice of the Eustachian tube, somewhat triangular in shape and bounded behind by a firm prominence, the Eustachian cushion, caused by the inner extremity of the cartilage of the tube which elevates the mucous membrane. This orifice is about one-third

to one-half inch behind the inferior turbinated bone. The posterior wall of the naso-pharynx is directed upward and forward meeting the superior wall at an angle constituting the vault of the pharynx. On the posterior wall, above the level of the Eustachian tubes, is a collection of lymphoid tissue most marked in childhood and known as the pharyngeal tonsil or adenoid vegetations.

The meso-pharynx or oro-pharynx is that portion of the pharynx bounded above by the soft palate and below by the root of the tongue and laterally by the pillars of the fauces. The anterior and posterior pillars are folds of mucous membrane enveloping the muscles of the pillars musculus glosso-palatinus and musculus pharyngo-palatinus respectively. These cause during contraction a lateral narrowing of the isthmus and simultaneously an upward movement of the root of the tongue and larynx. Between hypo-pharynx (pars laryngea pharyngis), and oesophagus, a boundary exists only functionally in the living. According to Killian this boundary is brought about by the tonic contraction of the lower part of the inferior constrictor of the pharynx. Since only during the act of swallowing the larynx recedes from the vertebral column, the retrolaryngeal part of the hypo-pharynx appears during the state of rest as a lumenless transverse fissure.

Structure: The pharynx is composed of mucous, fibrous and muscular coats. The mucous coat which is a continuation of the lining membrane of the Eustachian tubes, the nasal fossae, the mouth and the larynx is covered with ciliated epithelium in the naso-pharynx and stratified squamous in the oro and laryngo-pharynx.

The fibrous coat or pharyngeal aponeurosis is strongly marked in its upper part, and maintains the integrity of the wall of the pharynx where the muscular fibres are absent. Traced downward, it gradually becomes weaker, until it is ultimately lost as a distinct layer. It lies between muscles and mucous membrane, and only comes to the surface where the muscles are absent. It is also the principal means by which the pharynx is attached to the base of the skull. The muscular coat consists principally of the superior, middle and inferior constrictors on either side of which the superior set are attached to the base of the skull, the middle and inferior to the moveable parts of the hyoid bone and laryngeal cartilages. These flattened, fan-shaped muscles encircle the pharynx on either side and unite posteriorly in the median fibrous raphe. Their function consists in not only moving the bolus downward by peristalsis but they act as sphincters in closing off the oesophagus and naso-pharynx. The tunica muscularis pharyngis is, with the exception of the fornix, connected throughout to very loose cellular tissue thus greatly facilitating the various changes in the longitudinal and transverse diameters of the tube.

The lymphatic pharyngeal ring: Waldeyer applied this name to the lymphatic structures gathered into a sort of ring about the pharynx. On each side there are three chief collections of this tissue: lingual tonsil, palatal tonsil and pharyngeal tonsil.

The internal carotid artery is in close relation with the pharynx, so that its pulsations can be felt through the mouth. It has been occasionally wounded by sharp-pointed instruments introduced into the mouth and thrust through the wall of the pharynx. The mucous membrane of the pharynx is very vascular, and is often the seat of inflammation, frequently of a septic character, and dangerous on account of its tendency to spread to the larynx. Due to the fact that the tissue surrounding the pharynx is loose and lax, inflammation may spread through it far and wide, extending downward into the posterior mediastinum along the oesophagus. Also, abscess may form in the connective tissue behind the pharynx between it and the vertebral column, constituting what is known as retropharyngeal abscess.

Now that I have given the reader a bird's-eye view of the general configuration of the pharynx, I shall briefly trace its blood supply and lymph drainage. The ascending pharyngeal, a branch of the external carotid runs along the lateral wall of the pharynx parallel with the internal carotid artery supplying that wall and the corresponding Eustachian tube. The soft palate and pillars receive their blood supply through the ascending palatine, a branch of the facial which also gives off the tonsillar branch to the tonsil.

The venous blood is collected into two plexuses, one within the posterior wall of the pharynx-plexus pharyngeus and one within the palatal segment-plexus palatinus. These communicate with the veins of the nose and tongue and finally empty into the common jugular vein.

Nerve Supply: The motor innervation of the pharyngeal musculature is as yet not sufficiently

understood. According to Réthi, the motor supply of the three constrictors, the stylopharyngeus and the muscles of the soft palate with the exception of the tensor comes from the pharyngeal plexus (vagus). The tensor veli palatini is supplied by a twig from the third branch of the fifth through the otic ganglion.

The sensory nerve supply comes from the pharyngeal plexus which is made up of branches from the vagus, accessorius and glossopharyngeus.

On the other hand, this loose and lax retropharyngeal tissue contains the retropharyngeal lymph nodes. These lie behind the upper part of the pharynx and in front of the arch of the atlas, being separated, however, from the latter by the rectus capitis anticus major. Their afferents drain an extensive area, comprising the nasal fossae, the naso-pharynx, and the Eustachian tube as far as the tympanum. Their efferents pass to the upper nodes of the deep cervical group.

From this one can readily see how easy it is for the retro pharyngeal nodes to become affected. The infant and very young child is particularly susceptible to frequent "colds" acute rhino-pharyngitis. At this age, too, the lymph nodes are very vulnerable and react markedly to the mildest attacks. Frequent "colds," acute rhinitis, therefore, may so alter the the repeatedly infected and swollen lymph nodes that they finally end in suppuration. This gives rise to retropharyngeal abscess, the size and location of which depends entirely upon the number of nodes affected and their respective situation.

Other etiologic factors are luetic and tuberculous spondylitis which give rise to the so called "senkungsabscesse" of the Germans. The lax prevertebral areolar tissue behind the membrana pharyngobasilaris is a very favorable location for pus to collect and thus forming an abscess.

The Latter Condition Is Secondary and Rare in Infancy and Childhood

Symptomatology—In little children this affection is not recognized until signs of dysphagia and dyspnea appear. It almost always begins with high fever. The symptoms vary greatly according to the location of the abscess. When situated in the naso-pharynx, nasal breathing is interfered with and the child cries with a nasal twang. Abscesses in the meso-pharynx whether retro-tonsillar or otherwise give rise to early disturbances in swallowing and spasmodic attacks of coughing. Hypopharyngeal abscesses cause stertorous breathing while the voice is pure and ringing. The slowly progressing "cold" abscess in adults may be diagnosed before the appearance of the above symptoms. The attending physician should especially become suspicious when told by the mother that the taking of the breast or bottle does not quiet the baby. In fact the child begins to cry much louder when taking the breast as swallowing is very painful.

The objective findings are not always easily demonstrable. In nursing infants one may feel a doughy mass, later a fluctuating swelling in the posterior pharynx wall. Retraction of the neck is always marked as moving the head forward is painful to the child because of pressure upon the abscess. The upper deep cervical lymph glands may be found swollen since they drain the retropharyngeal nodes. Right here, I shall remind the reader of the different positions of the abscess. And only when present in the oropharynx can one see it with the aid of a tongue depressor. An abscess located in the epi or hypo-

pharynx can only be found by digital examination. That many physicians frequently forget this point leads to mistaken diagnosis, causing untold suffering to the infant and great anxiety to the parents.

Only recently two of such cases came to my attention. Oddly enough both these cases have gone undiagnosed for several weeks having been treated by not less than half a dozen physicians, including pediatricians. One of these cases after having been treated by the attending physician for lobar pneumonia for ten days, was finally diagnosed by the very same physician as cerebro-spinal-meningitis and the Board of Health was quickly summoned to do a lumbar puncture.

The other case was treated for pneumonia and otitis media. Both these cases have been referred to me by my friend and colleague, Dr. William Cohen, who was the last man to be called in either case, and who deserves the credit for having made a prompt diagnosis.

Diagnosis

The "cold" abscess occurring in adults appears rather without any inflammatory symptoms and may easily be mistaken for exostosis of the cervical vertebrae or for a retrovisceral struma but difference in consistency and finally exploratory puncture with needle and syringe will corner the diagnosis. The acute inflammatory retropharyngeal abscess differs from the former by the history of an acute onset, by the age of the child usually from six months to two years and by the usual enlargement of the upper deep cervical lymph nodes. It should not be forgotten that laryngeal diphtheria may occasionally very closely simulate retropharyngeal abscess. The dyspnea and stertorous breathing so commonly present with abscess of the laryngo-pharynx, will in the absence of a digital examination by the attending physician, readily be mistaken for laryngeal diphtheria.

Therefore it is of utmost importance in the examination of every infant and young child, especially with a history of frequent attacks of acute rhino-pharyngitis, to explore digitally the entire pharynx not only from above downward but from side to side.

The "cold" abscess due to luetic or tuberculous spondylitis is more frequent in adults and in addition will give symptoms referring to disease of the cervical spine such as severe pain in turning and bending the head backwards and then suddenly bending it forward. Also extreme tenderness on pressure is elicited, deformities of the cervical spine are present and the Roentgen rays will demonstrate disease of one or more cervical vertebrae.

Treatment

In little children the early incision of the abscess is very important, because there is always the danger of suffocation and aspiration pneumonia. The incision must be made very cautiously with the head bent well forward so that the larynx should not overflow with pus. When the abscess is in the oropharynx it is best opened with a guarded knife making a small incision and then enlarged with a pair of forceps. Abscesses in the epipharynx or hypopharynx should better be opened digitally as the use of a sharp knife in the invisible parts of the pharynx may precipitate uncalled for trouble. A tuberculous abscess may also be punctured and the cavity filled with iodoform-glycerin, yet an external incision cannot always be avoided and one is compelled to perform a pharyngotomy lateralis. Occasionally one incision is not sufficient and one is forced to operate

again. The postoperative treatment consists in applying argyrol to the rhio-pharynx by the drop method through the nose. This may be used from 10 to 25 per cent. according to the age of the patient. The patient should be placed in bed with the head lowered and given plenty of fresh air and tonics such as cod liver oil and the syrup of the iodide of iron.

Summary and Conclusions

Retropharyngeal abscess though comparatively rare in occurrence is an affection of infancy and early childhood. It frequently goes undiagnosed because of failure on the part of the attending physician to properly examine the pharynx. The latter should be examined digitally from above downwards and from side to side. The 'cold' abscess due to luetic or tuberculous spondylitis is a disease of adult life and runs an entirely different course. The incision should be made with a guarded knife when the abscess can be seen; as when located in the oropharynx. Abscesses located in the epi-pharynx or hypopharynx should better be opened digitally. The head of the child should always be bent well forward when the pus is being evacuated or better turned completely overhead downward and feet upward.

213 Henry Street.

DISEASED TONSILS*

W. T. BRUNER, M.D.

DEPARTMENT OF EYE, EAR, NOSE AND THROAT OF THE SOLOMON CLINIC.

Louisville, Ky.

The following case reports are given to emphasize the importance of a careful and painstaking examination of the tonsils in all disorders of an obscure origin. It is an every day occurrence in the Clinic, in making routine examinations, to find diseased tonsils, where no throat trouble had ever been suspected by the patient. Sometimes, the history of sore throat dates back so far and has been of such a character as to lead to false conclusions, regarding the part played by the tonsils in the patient's conditions.

Case 50—C. W., male, age 57.

Came to the Clinic with the statement, that, about a month ago, had attack of vertigo; since then, can hardly walk, at times, without assistance. Case had been diagnosed in Louisville and in West Baden as an auto-intoxication, gastro-enteric in origin. Spent two weeks at West Baden Springs, but continues to have vertigo. Previous history good with the exception of lumbago, several times for short periods, only. None since 1918.

Urinalysis—negative. Blood—negative. Wassermann—negative. Examination of throat revealed left tonsil, large and imbedded in a mass of adhesion; right tonsil not so large, but both tonsils diseased. Removal of tonsils was followed by a cessation of vertigo and complete recovery, otherwise. The patient has gained ten pounds in weight since the tonsils were removed.

Case 59—H. C., male, age 43.

Symptoms—Headache; cough, with much expectoration, past two months; eyes, burn, at times—feels as if there were pressure behind eye balls.

Past history—Acute articular rheumatism, about twenty years ago; in bed, a week or more. Often has had slight recurrence, since, but not enough to disable.

Urinalysis—negative. Leucocytosis—16,700. Wassermann—negative. Tonsils—hypertrophied and septic; no history of throat trouble of any kind. Patient expressed surprise, when told his tonsils were diseased. Tonsillectomy, done under local anaesthesia. Symptoms all cleared up promptly. Says he has not felt so well in ten years.

Case 64—H. N., male, age 27.

For nine years, has been a sufferer from asthma, and, for five years, has been unable to work. Attacks, at night, would keep him from sleeping more than half hour, at a time. Never had sore throat or any symptoms, referable to the tonsils. Examination of throat showed tonsils slightly enlarged and well hidden behind the anterior pillar of the fauces. Exposing the organs to view, and squeezing them, slightly, brought an abundant purulent discharge to the surface, with unusually fetid odor. Tonsil-

*Read at a regular meeting of the Clinic Staff.

lectomy, done under local anaesthesia. The fourth day, after the operation, the patient came to the office with the statement, that he had slept all night and his mother had to wake him, a thing, unknown for years. This patient still has slight asthmatic attacks, but the improvement is so marked, as to warrant the belief, he will recover.

Case 71—S. T., male, age 26.

Had had frequent attacks of asthma for the past six months. Vaccine and other treatment failed to give any relief. Never had sore throat. Examination of throat revealed small tonsils, deeply imbedded, but unmistakably septic.

Urinalysis—negative. Mild leucocytosis—10,630. Wassermann—negative.

Tonsillectomy cleared up all of the symptoms very promptly.

Case 74—G. P., male, age 27.

Trouble began with headache, which became constant; pain not severe, mostly on right side, extending from forehead to occiput. Three days later, noticed he could not whistle and unable to close right eye, which was wide open and watery. Mouth drawn to left side. Speech not clear. Past history negative. Never had sore throat. Examination showed submerged tonsils, fairly large and markedly diseased. Facial paralysis cleared up promptly following tonsillectomy. It is our belief that this patient's paralysis of facial nerve was wholly the result of his septic tonsils.

In the making of diagnoses in the clinic, one of the routine procedures is to subject every patient to a careful examination of the eyes, ears, nose and throat. We have been amply rewarded on many occasions by such procedure.

ALCOHOL AND VITAMINES

W. F. McNUTT, SR., M.D.,
San Francisco.

Alcohol and vitamins seem to occupy the center of the stage at present. Alcohol is a very old subject, vitamins a very new one. Much of the trouble in regard to alcohol is caused, not from its use, but from its abuse. Unfortunately it is those who constantly or occasionally indulge to excess who are loudest in their cry against the Volstead Act. These when joined by the great army who never abuse it, but are not possessed with the spirit of St. Paul, "if meat causes my brother to offend, I will eat no flesh," add to the discontent.

In the practice of medicine alcohol is of much less importance and less used than formerly. Before the days of the hypodermic syringe and the many remedies, then not known, whiskey was the great remedy for shock, heart weakness, etc. Physicians now can well dispense with its use.

The question of alcohol, may not be settled in this generation. Usage is second nature. Those who abuse it think they should be allowed to continue. Those who used wine can see no reason why they should be deprived. Many who constantly used beer, think beer a necessary part of their existence. They seem to forget, they are defying the law. That every citizen should obey the law of the country in which he lives. That the life—the very existence of a democracy depends upon the majority rule. Vitamins, unfortunately the medical profession takes up fads as women take to fashions.

The medical fad at present seems to be vitamins. Many laboratories have one or more working at vitamins in hope that chemistry will reveal its nature. As yet we know very little of the chemistry or therapy of vitamins. "A substance belonging to a group of organic basis of unknown composition which is present in small quantities in food, and is necessary for the normal process of metabolism. The absence or insufficiency of these substances is supposed to be the cause of beriberi, pellagra, rickets and scurvy." With so many able and competent men working in well equipped laboratories we hope and believe, we will soon know more of the chemistry of vitamins.

Thus far chemists have given us three vitamins, A B C experimenters (on rats) give each of the three a different therapeutic action. Chemists tell us that heat rapidly diminishes the vitamin contents of food. But for infants a short boiling of milk immediately before feeding preserves the vitamins to a greater extent than a long pasteurizing.

We know that a perfect food must contain protein, carbohydrates, fats, mineral salts and vitamins. In beriberi, pellagra, rickets and scurvy, is it always the absence or insufficiency of vitamins that produces these diseases? Who knows? Chemists tell us that vitamins are found in food only in very small quantities. Does the larger quantity as prescribed embarrass the digestion or does it disturb the eliminating organs? Or do the tablets, etc., though made from fruits or vegetables which are most abundantly supplied with vitamins, contain any vitamins when prescribed.

Most of our ailments are produced by over eating, or drinking, or smoking or carelessness generally and are temporary and do not call for heroic treatment. Might it not be well for physicians to be more careful about prescribing special doses of vitamins while we know so little of their chemistry and therapy? The etiology of so many diseases is obscure. Rickets is given as an instance of absence or insufficiency of vitamins. Now comes the theory that there are two varieties of rickets. One produced by lack of calcium salts, one by lack of phosphorus (in the food). A third theory, perhaps more as a suggestion, that rickets may be produced by the excess of calcium salts.

The British Medical Research Council of vitamins says, "We still have almost no knowledge of the nature of these elusive food substances or of their mode of action, but we have gained empirical knowledge already of the greatest practical value, for the prevention of scurvy and other grave diseases and for the promotion of health and beauty in the population." *Journal A. M. A.*, March 11, page 734. Have we?

If heat diminishes vitamins in our food, might it not be better for physicians to insist upon the generous use of such uncooked fruit, berries and vegetables as chemists find contain vitamins. Most uncooked fruit and berries are palatable and a few vegetables. Until chemists and experimenters learn more of the nature and therapy of vitamins, would it not be wisdom for us to depend upon a mixed diet for our supply of vitamins.

The safest and wisest physician is he who never prescribes a remedy of which the profession knows nothing of its chemistry or its therapy. By judicious propaganda a demand is made for vitamins, in pill or tablet form and a want rather than the need is supplied. Is there not too much loose prescribing;

Syphilis and Marriage

Kleeberg's text is a woman of 39 who has been apparently free from manifestations of syphilis since 1903 when she was given a course of injections. She has passed through fifteen pregnancies, and nearly all the children and foetuses showed inherited syphilis, most severe in the fifteenth child. He emphasizes the vast difference between the effects of syphilis in the man and of syphilis in the woman, when it is a question of marriage. Every woman with a history of syphilis, regardless of the length of the interval since infection, should be given a course of energetic treatment when she becomes pregnant, unless there is absolute certainty that abortive treatment had eradicated the disease. Otherwise the woman is liable to transmit syphilis to her offspring throughout her entire reproductive life.—(*Med. Klin.*, August 7, 1921.)

Serous Meningitis Complicating Subacute Otitis Media Mastoidectomy—Recovery*

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C. H. K., age 45, was first seen by me on November 30, 1921. He gave the following history:

About two months ago was seized with a dull, aching, throbbing pain in the left ear which persisted until about six weeks before. There was a spontaneous rupture of the drum membrane at that time, followed by a bloody discharge for one day only. The pains in the ear immediately disappeared and he thought no more of the ear, although he had been quite ill, running a temperature between 101° and 103°. His tongue had been heavily coated and he had been unable to sleep and was very restless.

Upon examination I found slight redness of the left membrane tympani without bulging and no discharge from the canal. His temperature was 103°. He was very restless, tossing around in the bed, complaining of violent headache. His tongue was heavily coated and there was a stiffness in the neck. He was sent to the French Hospital for further observation and treatment.

Dr. R. H. McConnell examined him with me and found marked rigidity of the neck muscles. Kernig sign was present. The leucocyte count was 28,000. X-ray of the mastoid showed the left to be cloudy. The examination of spinal fluid showed a cell count of 1,000 cells, without growth of bacteria upon culture.

Examination of the eyes by Dr. May was as follows: Pupils normal in size, circular, equal, normal in reactions. External ocular muscles, good motion in all directions, eyes parallel, no paresis of external muscles. Fundi, both absolutely normal.

Upon this evidence we made the diagnosis of subacute mastoiditis with serious meningitis, and advised an immediate mastoidectomy.

The usual simple mastoid operation was done on the first day of December. The cortex of the mas-

toid and cells were found to be sclerotic and there were no areas of granulation in the cells. No pus was found in the mastoid. The lateral sinus was placed forward and was uncovered. It appeared to be much darker in color than normal and it was uncovered throughout its course in the mastoid wound. From its appearance I feared a thrombus. It, however, was finally broken and from the free bleeding I was certain that no thrombus was present. The dura was exposed in the middle fossa and was normal in appearance. Postoperative condition was good.

He was a very sick man and we had fears for his recovery. His temperature for the next few days ranged between 100° and 102°, pulse about 90. His severe pain in the head persisted for a few days. He was restless, delirious at times, with twitching of arms and legs, and had to be catheterized. On December 3rd he was irrational at times, twitching of arms, pain in back. December 4th he voided for the first time since the operation and on December 5th was more rational, with less twitching and some nausea. On December 9th had chills and temperature 101.4°, pulse 100, respiration 32, and was very restless. The wound was found to be in a satisfactory condition. On December 15th his temperature became normal and continued so. On the 18th he was allowed to get out of bed for 15 minutes. The time of being out of bed was gradually increased day by day as his strength increased. He was discharged from the hospital on the 24th of December, and came to my office for dressings until the wound was completely healed.

He is perfectly normal now and the mastoid wound has completely healed and the ear has good function. He hears all the notes both by bone and air in this operated ear, but his hearing is somewhat deficient for the voice and the watch.

40 East 41st Street.

ANAMNESIS ROENTGENOLOGICA

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New York.

I have adopted this rather bizarre terms so as to forcefully impress upon the clinician the necessity of conveying some information when referring patients for roentgen examination.

I will quote from Butler¹: "The diagnostician acquires the facts upon which he is to form an opinion, (1) by interrogation, the information obtained is called the history or anamnesis; (2) by observation (or examination), the *status praesens* is derived."

L. Ombredaune and R. Ledoux-Lebard² state that a rational X-ray examination of any subject must in the first place be clinical. Written documents will dispense with part of the examination.

Apropos, it would be lucid for further understanding to review briefly, the methods employed by the clinician and roentgenologist in drawing his conclusions. As is well known, a clinical diagnosis is deduced subjectively, by recording the patient's past and present symptoms. The objective methods, how-

ever, comprise inspection, palpation, percussion, auscultation, auscultatory-percussion, and bimanual examination. Other physical methods are employed some of which are the examination of blood, cytology, biopsy, microscopy and electro-diagnosis, the latter being used by neurologists; the tuning fork used by otologists, and transillumination employed by rhinologists.

Finally, by elimination, a diagnosis true or tentative is reached. In spite of the various methods employed in attempting to reach a diagnosis, it is often difficult and at times almost impossible unless a more direct method is employed such as a supplementing X-ray examination.

I have, in the foregoing, cited fairly generally the various methods employed by the clinician. The roentgenologist bases his conclusion on (1) the anamnesis; and (2) certain objective procedures. fluoroscopy and radiography. In the latter classification, the following also belong, such as teleroentgenography and stereoscopy; (3) by comparison and elimination.

There are, of course, instances where reflex symptoms, rather frequently seen and disillusioning in

*Read before the Otological Section N. Y. Academy of Medicine, Feb. 10, 1922.

character, are the only guide as to the ill-being of the patient. As an illustration, I may cite the following:

Male, age 19, referred for **cardioskiagraphy**. A brief physical examination revealed some dyspnea, slight cyanosis, marked hypertrophy of the left ventricle and auricle, double mitral murmurs with beginning decompensation. Roentgen examination revealed, in addition to the cardiac condition, second stage pulmonary tuberculosis, involving the upper lobe on the left side. This condition was overlooked by two clinicians, who have been impressed merely by the importance of the heart symptoms. The boy eventually died of the rapidly advancing phthisis.

Another rather interesting case was referred by Dr. B. for roentgen examination of the descending colon, to which area the patient referred casually. In the course of the routine examination, I noticed on the fluorescent screen a rather large collection of fluid in the right pleura. The patient had at no time referred to such discomfort as one would expect. Subsequent x-ray examination revealed a filling defect of the descending colon, which on account of its appearance and other clinical signs, a tentative diagnosis of carcinoma was entertained. On aspiration of the chest, a bloody fluid was withdrawn which from the clinical findings, it is believed that a metastasis had already occurred. The outstanding feature in this particular case is that the chest condition was entirely overlooked by the clinician, and it could have possibly been overlooked during my examination if the usual routine had not been observed.

While some cases can be recognized by the x-ray before clinical measures are of avail, Carman and Miller³ write on suspected cancer: "There is no intent to say that clinical data should be discarded. On the contrary, the roentgenologist should be acquainted with the clinical facts in every instance. If sug-

gestive of cancer, they will stimulate him to a more exhaustive search."

A. R. McMillan states:⁴ "It has been said that the radiograph is the otologist's best consultant. If it is to be used as important a consultant, it must be used after obtaining a complete clinical data." In conclusion, he states: "The complete clinical history and physical findings should be known before an opinion is given."

The following case-report amply illustrates the importance of a clinical history: adult, male, referred for mastoid examination. The physical signs were those of chronic recurrent otitis media purulenta, and occasionally slight mastoid tenderness. The skiagraph visualized sclerosis of the antral cells, and an oval area of diminished illumination in the mastoid process about the size of a sparrow's egg, surrounded by a narrow margin of compact cells. This condition suggested evidence of a partial mastoidectomy. In the absence of a history of previous operation, however, a cholesteatoma was the conclusive diagnosis. It is obvious, therefore, that an accurate interpretation would have been futile without a clinical history.

Because none are infallible, I can in consequence reiterate Cole's dictum:⁵ "The radiologist can recognize and differentiate these conditions with about the same amount of certainty as can the surgeon at an exploratory operation without the microscopic examination of the specimen."

It is evident from the numerous citations that subjective and objective signs subsequent to a thorough clinical examination are correlative to, and form a *sine qua non* in roentgenology.

REFERENCES

- ¹Butler's Diagnosis, p. 81.
- ²Medical and Surgical Monographs, Vol. 5.
- ³Carman Miller, p. 172.
- ⁴The Am. J. of Roent., July 1921, p. 309.
- ⁵L. G. Cole, Journal A. M. A., November, 1912.

The Air Content of Butter

JACQUES W. REDWAY, F.R.G.S.,
Mount Vernon, N. Y.

About ten per cent, of the volume of butter consists of air. Air and its dust content is carried into milk at the moment of milking. Still more is blown into it during the cooling process. Another addition is made at the separator. Some is churned into it—a considerable proportion, in fact. In the kneading process air is worked into the butter; it is likewise kneaded out.

The effect of churning air into a food product is illustrated in the case of fabricated ice cream. Six or seven gallons of the fabricated mixture is put into the freezer and churned or stirred until the volume is increased to ten gallons, by the addition of air.

Now, if the air that is churned into butter were pure and free from dust, one might assume that the occluded air would be harmless. Perhaps this might be the case, but experiment has shown that the contrary very probably is true. Butter exposed to the air becomes rancid unless a preservative is added. So does butter packed tight in firkins. It is the air within quite as much as the air without which causes the change. It is oxidation as well as putrefaction.

The Department of Agriculture has presented some figures worth noting. Freshly churned butter was analyzed as to its free oxygen content at measured intervals. When the butter was kept in still air at a temperature of 32° Fahrenheit, the changes in the amount of free oxygen were slow. An average of many samples showed that at the end of less than two months four-fifths of the free oxygen had entered into chemical composition with the butter fat. At ordinary room temperatures the disappearance of the free oxygen was very rapid. That is, an oxidation of the elements of the butter fat had occurred, which not only impaired the flavor of the butter but also caused a destruction of the vitamins. With the loss of the vitamins the food value is

lowered, or perhaps disappears; there remains only the fuel value.

The moral is obvious. Foods require preservatives; otherwise they must be prepared in an atmosphere which contains no free oxygen. Professor W. P. Heath finds that an atmosphere of carbon dioxide is effective in preventing oxidation; it also imparts a pleasant flavor to butter.

In the manufacture of butter Professor Heath forces carbon in the churn at the bottom, thereby displacing the air at the top. With careful manipulation, practically all the free oxygen is expelled and the prepared butter is aerated with an atmosphere which not only prevents rancidity but preserves the vitamins as well.

The investigations of the Department of Agriculture leave no doubt about the value of a process which excludes free oxygen from the manipulation of food preservation. Experiments show that butter with a content of carbon dioxide instead of air will remain sweet for a long time—indefinitely, in fact.

Carbon dioxide is a pleasant stomachic stimulant and its consumption in aerated beverages is increasing. Indeed, humanity drinks millions and millions of gallons of aerated waters daily during the summer months, not for the sirups but for the refreshing effects of the carbon dioxide. It therefore should be as acceptable in butter and ice cream as in the so-called soda water.

Butter fat is by far the most important of the food fats, and its importance is due to its vitamin content. If the presence of carbon dioxide will preserve the vitamins, that fact alone is sufficient reason for its employment. At all events many dairies are giving the process a trial, and certainly it is worth trying.

Meteorological Laboratory.

Diabetes in the Negro

With Report of Eight Cases

HYMAN I. GOLDSTEIN, M.D.

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It has been thought very commonly that diabetes in the negro is quite unusual. While diabetes among negroes has not been so common comparatively as among the white population, it nevertheless is met with more often than one is led to believe, from a careful review of the available literature on the subject. One would expect to find syphilitic pancreatitis more commonly among the colored patients because of the greater frequency of positive blood Wassermanns among them. While it is true that syphilis is quite prevalent among the colored, diabetes is certainly not very common. In a series of about sixty-five (65) cases of diabetes mellitus—43 hospital cases and 22 dispensary cases (Polyclinic Hospital), whose records were reviewed, eight (8) cases occurred among the colored patients, of these, 6 were females and 2 were males. Only one (Case IV) of the cases in which blood Wassermann tests were made was positive for syphilis. This certainly is most unexpected, in view of what Warthin believes to be the case. If syphilis were such a very important factor in the causation of diabetes, then we should have many more diabetics both among the negro and white population, and particularly among colored patients that come to our clinics.

Warthin (*Am. J. M. Sci.*, August, 1916, p. 157) concludes that latent syphilis is the chief factor in the production of the form of pancreatitis most frequently associated with diabetes, but that diabetes is not always coincident with severe degrees of this type of pancreatitis.

Lemann (*Am. J. M. Sci.*, August, 1921, p. 226) does not believe that syphilitic pancreatitis is the common cause of diabetes mellitus. He states that while this disease is not rare in the negro, still the incidence is not as great among them as among the whites. He concludes that there is no relation between the incidence of diabetes mellitus and syphilis and that there is an unexplained immunity of the negro race to the production of spirochetal pancreatitis just as there is an unexplained immunity of the race to the production of (locomotor ataxia) tabes dorsalis.

Lemann (*So. Med. Jour.*, July, 1921, p. 522) disagrees with Warthin on the relationship of syphilis to diabetes. He based his studies on cases admitted to the Charity Hospital, New Orleans, where he found diabetes less common among the negroes than among the whites, although syphilis was more prevalent among the negro population.

Dr. Pancoast (February, 1898), at the request of Dr. Osler, reported a case of diabetes in a colored man, aged 50 years, before the Johns Hopkins Hospital Society. This patient had signs of tabes dorsalis and pulmonary tuberculosis. Dr. Fletcher stated that diabetes is a rare disease in the colored race. Of 69 cases of diabetes in the Johns Hopkins Hospital up to May, 1897, there had been 5 of the colored race, or a percentage of 7.2. Of the 6 cases (including Pancoast's case), 4 were women and 2 were men.

In children, girls have diabetes more frequently than boys, in the adults (white) the ratio of the male to the female cases is about 3 to 2.

Pancoast, in presenting his case, said that "diabetes in the negro is rather rare." The patient's blood and

urine gave the Bremer (St. Louis) reactions for diabetes.

Lemann (1921), however, states that "it was formerly thought that diabetes mellitus was relatively rare in the negro. While this disease is not rare in the negro, still the incidence is not as great among them as among the whites."

At the Charity Hospital, New Orleans, during 1898-1909, there were 45 white diabetics and 19 negro diabetics in 61,298 admissions. The negroes furnished 40 per cent of the admissions and only 30 per cent of the diabetics. The total incidence was 0.63 per 1,000. The incidence among the whites was 0.72 per 1,000, while among the negroes it was only 0.47 per 1,000. During 1910-1919, in 160,044 admissions there were 135 white diabetics and 59 negro diabetics. The negroes furnished 43 per cent of the admissions and only 30 per cent of the diabetics.

Krishnamurti Aiyer, in his paper on "Diabetes in Madras" (*Indian Med. Gazette*, November, 1919, pages 410-411) states that the disease was rare among the Brahmans of the Madras Presidency a few generations ago and that it is even now rare among the women, and more so among the widows. He then explains the reasons for these differences.

Adfred C. Reed, in his paper on "Diabetes in China," concludes that it is less common in China than in the West, and that it will be found increasingly prevalent in China, as observation is extended more widely to the better classes of society. J. L. Maxwell was able to find only two cases in 12,000 in-patients in China. Lambert found only one case of diabetes in 24,000 out-patients in Nanking, all drawn from the lower classes of society.

J. P. Maxwell reported 11 cases of diabetes from Yungchun, Fukien, while Dr. Park reported 8 cases in five years out of 3,000 to 5,000 persons seen annually in Soochow, Kiagsu. His practice is restricted to first-class patients.

Mosenthal (Tice, Vol. IX, page 96) says "The Jewish race have, according to many, been disproportionately subject to diabetes. In the dispensaries of New York and Baltimore, this fact is very evident. The Hindus in India are peculiarly susceptible to this disease. It occurs not infrequently in the colored population." Whether the general impression that it is less common among them than among white people is warranted or not is correct is a question to be determined.

Allen (Nelson's Medicine, Vol. III, page 57) says "negroes are by no means immune and correct statistics may show a rather high incidence among those in America, perhaps related in part to the frequency of syphilis. The Japanese, however, seem to afford an example of high racial immunity."

Joslin (Oxford Medicine, Vol. IV, page 139) mentions the fact that "heredity and obesity unite to explain why the incidence of diabetes in the Hebrew race is more than double that in non-Hebrews." He says nothing about the negroes, Japanese, or Hindus.

Summary and Conclusion

1. Eight cases of diabetes in the negro are reported in

this paper, six females and two males, in a series of 65 cases of diabetes mellitus.

2. Diabetes in the negro is much less common than in the white population as seen in the medical clinics of our hospitals.

3. Syphilis is not an important causative factor in negro diabetics.

REPORT OF CASES.

CASE I.

Ethel B. Dixon. Colored. Female.
Admitted Dec. 1, 1920, to hospital. No. 6086.
Discharged Dec. 24, 1920. Dressmaker, Age 33.
Service of Dr. Albert E. Roussel.
Complaining of weakness and loss of weight.
Father died of pneumonia. Mother, 4 sisters and 3 brothers living and well. One brother died from T.B., one sister died from dropsy.

Previous History: Had measles, whooping cough and typhoid fever in childhood. Appendectomy, tubes and ovaries removed.

Previous illness: Entirely well until February, 1920, when she began to feel tired. She had polyurea about the same time. Two months ago (October, 1920) began to have great thirst and drank large quantities of water. Ankles began to swell in August, 1920, and had sensation of pin pricking in ankle. Had cramps in right leg which would awaken her in the morning. Hands and feet cold. No itching, or burning on urination. No pruritis. Has been weak, and felt as "if legs would give way." Lost 30 pounds in two months. Constipation. Shortness of breath on exertion. At times has pain over the heart and palpitation. Very nervous. Pain over the heart and palpitation. No dizziness or faintness.

Physical Examination: Well developed and nourished adult colored woman. Weight, 168½ pounds.

Eyes—react to light and accommodation.

Nose—some catarrhal condition.

Ears—negative.

Mouth—distinct sweet odor to breath. Teeth generally poor; many filled and capped. Tongue—heavily white coated. Throat—negative.

Neck—no adenopathy, no thyroid enlargement.

Chest: Lungs: negative, except for some impairment over left apex.

Heart: Negative. Blood pressure: S.120/D.70.

Abdomen: negative. Large scar on abdominal wall.

Extremities: reflexes normal. No deformities.

Dec. 4, 1920—Alveolar air 35.

Dec. 10, 1920—Alveolar air 27.5.

Dec. 9, 1920—Alveolar air 25.

Voided 24 ounces urine first day, then 33, 59, 60 73½, 25, 32, 35, 24, 56, 52, 48, 38, 58½, 52, 48, 40, 46, 50, 48, 42, 50.

Intake Water (24 hours) 30 ounces, 28, 70, 72, 30, 40, 30, 30, 63, 56, 38, 32, 52, 48, 50, 30, 42, 48, 46, 50, 48.

December 24, 1920, weighed 162½ pounds.

Urine Analyses:

12/3/20 straw color; alkaline reaction; no albumin; no sugar; no R. B. C.; no crystals.

12/4/20, 24 hour specimen; sugar 3.6 per cent.; no acetone; no diacetic acid.

12/7/20. Trace albumin. Sugar present.

12/8/20. 11:30 A. M. Trace albumin. Sugar 3 per cent.; no acetone; no diacetic acid; 11:30 P. M. 5 per cent. sugar; acetone present; no diacetic acid.

12/9/20, 11:30 A. M. No sugar; no acetone; no diacetic acid.

12/22/20. Urine analysis entirely negative.

12/2/20 *Blood Count:* R. B. C. 4,540,000. W. B. C. 9,070.

Hemoglobin 90 per cent. Differential—small lymphs 30 per cent., Baso 1 per cent.

Large lymph. 1 per cent. Trans. 1 per cent. Polys. 65 per cent. Eosino. 2 per cent.

12/6/20 *Blood-urea nitrogen* 12.3 mgm. per 100 c.c.
creatinine 1.96 mgm. per 100 c.c.

Blood sugar 290 mgm. per 100 c.c.

12/6/20 *Blood Wasserman*—

Antigen I cholesterinized

II Alc. syph. liver

III Acet. Insol. lipoids

Negative

Quantitative—Negative:

Serum 0.1 c.c.

0.02 c.c.

0.004 c.c.

0.002 c.c.

0.001 c.c.

Hecht-Gradwohl.

12/2/20 *Feces:* Diarrheic; fluid consistency; green color; no mucus; no blood; no pus; bile present; alkaline reaction; no

curds; no concretions; no parasites; no ova; vegetable fibres; muscle fibres; calcium soap; bacteriological exam. predominantly gram negative.

I have carefully watched her condition for six months; she is doing very well, and the urine is now persistently free from sugar and has been so far many months. She still occasionally comes to the clinic at Polyclinic Hospital for urine analysis; and is kept under observation as a "latent" or subdued case of diabetes.

She was admitted to medical ward 2/16/22.

Discharged 2/23/22.

Temp., P. R. normal.

2/16/22 *Urine analysis.* Amber, no sediment, acid, S. G. 1.010. Faint trace albumin. No casts. Few round epithelial cells.

2/19/22 *Blood Count*—R. B. C. 4,900,000; W. B. C. 7,560; Hemoglobin 70-75 per cent. Talq. 82 per cent. Sahli. Differential

—Small lymph 21 per cent.; large lymph 1 per cent.; transitionals 8 per cent.; Polymorph 69 per cent. Eosinophiles 1 per cent.

Sugar Tolerance:

Sugar I 89 mgm. per 100 c.c. of blood

II 317 mgm. per 100 c.c. of blood

III 202 mgm. per 100 c.c. of blood

IV 92 mgm. per 100 c.c. of blood

Blood Chemistry:

Urea—N. 10 mgm. per 100 c.c. blood

Creatinine— 1.3 mgm. per 100 c.c. blood

Sugar— 87 mgm.

Uric Acid— 2.5 mgm.

Chlorides NaCl 462

As Cl 280 mgm. per 100 c.c. blood.

2/20/22 *Basal metabolism*—Rate plus 4.

Blood pressure S 120

D 65

Weight 139¼ pounds.

Height 5' 1".

CASE II.

Patient: E. C., negro.

Married; age 48; barber.

Came to the Medical Clinic, Polyclinic Hospital (Dr. A. E. Roussel's service), complaining of fullness over epigastrium (March 23, 1920).

Discharged May 10, 1921.

Urine Analysis: Sugar 1.05 per cent. Diacetic acid present. 4/8/20 Amber, acid, 1.015, cloud of albumin, sugar present 1.1 per cent. No acetone; no diacetic acid; few hyaline and fine granular casts; few leucocytes; no R. B. C.; no crystals. 4/22/20. Light straw color; acid reaction; trace albumin; no casts; no R. B. C.; fine uric acid crystals; sugar 5.2 per cent. 6/17/20. No sugar; no acetone; no diacetic acid.

CASE III.

C. A., colored woman; aged 55 years; married; two children living and well; two miscarriages.

Chief Complaints: Backache, headache, polyuria.

Parents dead. Menopause 4 years ago.

Polyuria for some time. Pruritus and furuncles. Urinates very often during day.

General physical examination unimportant.

Urine Analysis: Acid. S. G. 1035; very faint trace albumin; sugar 2.1 per cent.; leucocytes—numerous clumps; few squamous cells; urates; yeast cells.

Differential Blood Count: Polys 52 per cent.; small lymphs 40 per cent.; large lymphs 2 per cent.; transitionals 3 per cent.; eosinophiles 2 per cent.; baso 1 per cent.

Blood Chemistry:

Sugar 152 mgm. per 100 c.c. blood.

Creatinine 1.4 " " " " "

Urea-nitrogen 16 " " " " "

CASE IV.

Felix S.

F. S., aged 56; Dr. A. E. Roussel's service, Polyclinic Hospital. Laborer; negro.

Complains of pain in the chest, loss of weight, and weakness in his knees. Admitted to ward Sept. 3, 1920. F. H. Two brothers died of yellow fever. Two sisters living and well.

P. H. Had measles and mumps.

Three weeks ago, began to have pain in the chest, and shortness of breath; suffers from headache; very costive.

General physical examination negative.

Weight 110¾ pounds.

Urine Analysis:

9/7/1920 shows no acetone; no diacetic acid; sugar 3.5%; no albumin; no casts.

9/10/20 Sugar 1%.

9/7/20 *Blood sugar*—340 mgm per 100 c.c. whole blood.

CASE V.

E. W., admitted January 6, 1921; Dr. Geo. M. Piersol's service, Polyclinic Hospital. Aged 55; negress.

Complains of frequent urination.

Parents died aged 72 (father) and 82 years (mother). P. H. Patient had scarlatina, diphtheria, smallpox, typhoid fever; had eight children; two living and well; six died soon after birth. About four years ago began to lose weight rapidly. She had great thirst and passed large quantities of urine frequently.

General Examination:

Lungs: few moist vales are heard over both bases, posteriorly. Expansion is good and equal.

Heart: slightly enlarged toward the left; systolic murmur heard at apex and transmitted into the axilla. A systolic murmur is also heard at the second right interspace and is transmitted into the neck.

Abdomen: negative.

Weight 149½ pounds.

S. 190

Blood Pressure:

D. 100

Urine Analyses: Showed sugar varying from 5%—1.43% (Jan. 7, 1921—Jan. 24, 1921). S. G. 1.035. Acid. Trace of albumin. No casts.

Blood Chemistry: Blood sugar 260 mgm. per 100 c.c. Whole blood; urea-nitrogen 10.7 mgm; nonprotein-n. 54.6 mgm; creatinine 1.92 mgm. per 100 c.c. blood.

Blood Count:

R. B. C. 5,300,000.

W. B. C. 8,300 Hb 92%.

Blood Wassermann—negative (quantitative).

1/11/21 Alveolar CO_2 —18

1/13/21 Alveolar CO_2 —15

(reagent apparently bad)

She has an old osteoarthritis of the right hip with destruction of the head and neck of the femur. There is also calcareous deposits about acetabulum and head of femur. (Roentgenographic report).

CASE VI.

H. M., Dr. Goepf's service. Polyclinic Hospital, 3/2/21 Complains of dizziness, and occasional sharp supra-orbital headache for nine months. At times she cannot stand because of dizziness. Lost 17 pounds in past two months. Drinks ten glasses of water daily. Ringing in the ears at times. Sharp cutting pains around umbilicus. F. H. All are obese. An older sister has diabetes mellitus.

P. H. Menses began at 13 years, normal. Two still-births; no miscarriages. Urinates twelve times during night. Married eight years.

Examination:

Obese colored woman.

Some pyorrhea present. Throat negative. Blood pressure S. 135.

D. 100

Heart and Lungs: negative.

Urine Analysis:

Showed sugar present, varying from 2.2% to 6.6%. Specific gravity 1.035. (Aug. 5, 1921—Nov. 10, 1921). No diacetic acid; no acetone; trace only of albumin.

Baranay tests: normal.

Urine analysis, January 9, 1922, showed no acetone; no diacetic acid; sugar 4.2%.

CASE VII.

M. B. J., negress; 8/30/21—9/30/21. Dr. Goepf's service, Polyclinic Hospital. Housework. Itching on inner side of thighs; epigastric pain and headache. F. H. negative.

P. H. Had measles and mumps; otherwise well; married; five children; no miscarriages. For past two years has had continuous itching on inner side of thighs. For past six or seven years has complained of pain in left lumbar region, continuous and sometimes sharp, radiating up back around tip of scapula. Occipital headache off and on for six or seven years; polydipsia, polyuria, nocturia, severe burning, on urination. Periods regular. Last child 20 years ago. Menopause at 45 years.

Weight 117½ pounds.

S. 114 . 120

Blood pressure

D. 68 68

Urine Analysis:

8/31/21. 1.018; trace albumin; sugar positive; no casts; few leucocytes; few amorphous urates.

9/7. 1.020; no albumin; no casts; no sugar; no R. B. C.; amorphous trijole phosphates.

9/1/21. Renal Function Test.

1st 40%

2d 10%

3d 5%

Total 55% 3 hours

9/3/21 urine analysis 1.035; sugar 1.86%; no acetone; no diacetic acid.

8/31/21 **Blood Count** R. B. C. 5,130,000.

W. B. C. 13,200; Hb 75%

Small lymph 40%

Large lymph 4%

Trans. 1%

Polym. 55% (Dr. Dardin)

Blood Chemistry 8/31/21

Sugar 286 mgm. per 100 c.c. blood.

Nonprotein-n. 30 mgm.

Urea-n. 19

Creatinine 2.6

Chlorides 255 mgm. cl. per 100 c.c. blood or

421 mgm. as NaCl. (Dr. Cowan)

9/13/21 **Blood Sugar** 150 mgm. per 100 c.c. blood.

Nonprotein-n. 32

Urea-n. 14

Creatinine 1.6

9/15/21 **Urine Analysis** S. G. 1.020; Sugar .62%; diacetic acid and acetone negative (Dr. Dardin).

9/20/21 Total 1640 c.c. urine, sugar present.

9/21/21 Total 1500 c.c. negative for sugar.

9/23/21 **Blood sugar** 68 mgm.

Urea-N 25 mgm.

9/28/21 **Urine;** no sugar; 1900 c.c. S. G. 1.010.

8/31/21 **Blood Wassermann** negative. (Yagle and Kohner).

9/1/21 Gastric Analysis:

40 c.c. normal gross appearance.

Total acidity 28

Free Hcl 4

Combined acids 14

Acid salts 10

Lactic acid—Positive.

Blood—positive.

Starch and fat—negative.

Specimen	Total	Free Hcl
1	22	
2	20	
3	50	
4	26	20
5	16	

Eye Examination:

Media O. D. appears clear. Disc large, oval 90%, central cup, outlines clear. Fundus normal. O. S. shows spots of opacity on lens capsule. Vitreous shows floating opacities. Disc and other details seen slightly hazily, probably due to vitreous changes. Disc large, slightly oval, healthy color and central cup. No lesion of retina or choroid apparent through undilated pupil. R 6/30. L 6/15.

9/28/21. Hearing slightly decreased. Tubal stuffiness. Contraction of both drums, particularly the left. (Dr. H. S. Wieder.) Nothing of importance on physical examination, except marked perineal relaxation and huge cystocele. Reflexes normal. Small tumor on inner side of calf of left leg about size of a large almond and fixed to the skin. Eczema of both thighs.

CASE VIII.

E. H., Philadelphia. Housewife. Negress; age 55; married. Dr. Goepf's service. Complained of pruritus vulvae and polyuria. Menopause at 41 years. Two children. No miscarriages. No stillbirths. Has had pruritus vulvae for three or four months, and with this had polyuria and excessive thirst.

4/16/20. No. 1964 (Polyclinic Hospital), Hospital Record.

Urine Analysis:

	4/8/20	4/9	4/10	4/12	4/13	4/14	4/15
Sugar.....	1.8%	.98%	neg.	4.3%	2.02%	neg.	neg.
Acetone	neg.	neg.	neg.	neg.	neg.	neg.	neg.
Diacetic acid ...	neg.	neg.	neg.	neg.	neg.	neg.	neg.

3/29

3/31

4/2

4/5

4/6

4/7

Acid

1.030

No albumin

Sugar plus 3.01% 7.1% neg. neg. 2.8%

No casts

No. R. B. C.

Few W. B. C.

No diacetic ac. no diacetic

No acetone faint trace faint faint neg.

trace trace trace

1425 Broadway.

Copper arsenits (Paris Green) was discovered in 1775 by Karl Wilhelm Scheele (1742-1786), Swedish chemist. He also discovered chlorine.—(Med. Facts.)

Experimental and Clinical Comparison of the Therapeutic Properties of Neosalvarsan

The Medical Research Council of England was requested by the British Board of Trade in 1915 to test biologically the different preparations corresponding to salvarsan and neosalvarsan offered for sale in England. The work done in this connection is the subject of an exhaustive report, published in *The Lancet* of April 22, 1922, by Dr. H. H. Dale, of the National Institute of Medical Research and Major C. F. White, the late commander of the Military Hospital, Rochester Row. Their report is based on experiments made by them in conjunction with four physicians attached to the Department of Biological Standards of the Medical Research Council.

In view of the great importance of the results obtained to the medical profession in America the *MEDICAL TIMES* is presenting the report in detail in order that the American physicians may have a thorough understanding of this most important subject.

"When 606 was first introduced, Ehrlich drew attention to the chemically uncontrollable variation in the toxicity of the product, and the necessity for testing every batch, to ensure absence of undue toxicity, before it was issued for use. Every batch of salvarsan made in Germany has, accordingly, from the first been tested at the Georg-Speyer Haus, in Frankfurt, before its issue. There is no evidence that the same practice has been adopted in the case of neosalvarsan; the pamphlet accompanying each package of this product contains no indication of the performance of a biological test, such as is described in detail in the pamphlet accompanying each ampoule of salvarsan. In the case of neither product is there any indication of a control for therapeutic efficacy; the control described is purely for freedom from undue toxicity, and that only in the case of the older 606. This relatively simple procedure may have been adequate in the circumstances of production in Germany, where the whole supply of both preparations has been made in one factory, working in close touch with the inventors.

The Problem in England.

"The problem presented in this country was somewhat different. The directions for making 606 were fairly complete in the patent specifications, and the only task before the manufacturers concerned was to find those precise working details, of the somewhat complicated and uncertain process, which would give, with reasonable uniformity, a product corresponding not only in chemical composition, but in physical properties with the original salvarsan, and having no greater direct toxicity than this preparation, as revealed by tests on animals. This was achieved by several manufacturers, and a satisfactory supply of 606 was obtained, was supplied throughout the war, and is still available.

"The position was not so clear in the case of 914. The details given in the patent specification are not adequate, and the composition of the product differs widely from that suggested by the theoretical formula. A substance corresponding to this formula would contain much more arsenic than the neosalvarsan to which the clinical worker was accustomed, and could not safely be supplied for use in the same dosage. Each manufacturer, therefore, had to supplement by his own ingenuity the imperfect information available, in the endeavor to make a product which could safely and adequately replace the familiar neosalvarsan. In these circumstances it did not seem justifiable to follow what was, apparently, the German practice with regard to neosalvarsan, and allow these substitutes to be issued without biological control. A new basis of testing had, therefore, to be formulated, founded not upon any existing German precedent, but upon what could be discovered from the literature and from actual tests of such samples of the original preparation as could be obtained. After a preliminary experimental period, which was prolonged by various conditions then existing, the basis was adopted on which products of this type have now long been and still are regularly tested. It was decided that only such batches should be allowed to be issued for therapeutic use as were tolerated by mice, on intravenous injection, in a dose of 0.3 mg. per gramme of body-weight. Each batch is tested on five mice in this dose, and if more than one mouse dies, or if definite bad symptoms are produced, the batch is rejected. Recent experience with an adequate series of batches of German neosalvarsan shows that the dose had been correctly chosen for the limit of tolerance for this product; nearly every batch of original neosalvarsan which has thus been tested will pass the test on the dose of 0.3 mg. per gramme of mouse, but all would fail if the dose were raised to 0.4 mg. per gramme.

Two Distinct Classes of Neosalvarsan Type.

"A short experience with the application of this test sufficed to indicate that the preparations of the neosalvarsan type submitted for test fell into two well-marked classes. On the one hand were those which resembled the German product more or less closely in appearance, in solubility, and in the rapidity with which their solutions underwent decomposition if left standing exposed to the air. On the other hand, there were others which had an advantage over the German product in their extremely free and rapid solubility, and which gave evidence of much greater stability in solution. Preparations of the former class had a border-line toxicity from the point of view of the test; many samples just passed it, and many others failed. A slight raising of the standard would have excluded nearly all. Those of the latter class—the freely and immediately soluble type—passed the routine test with an almost unbroken regularity; when, experimentally, sample batches of this type were tested on higher doses, it was found that many were tolerated in a dose of 0.5 mg., some even in a dose of 0.6 mg. per gramme; i.e., the toxicity was often only one-half of that at which they would still have passed the official control.

"No question of a control of therapeutic efficacy arose at this time. It would have been impossible, in any case, to carry it out with the staff available under war conditions. From the clinical side there was no hint of dissatisfaction; here again, in the hurry to get men through their treatment and return them to duty, no adequate control of results was possible. The practitioner appreciated the additional convenience afforded by rapid and perfect solubility, and the freedom from constitutional reactions, even when highly concentrated solutions were injected. The demand for the more soluble and less toxic type of product grew very rapidly, until manufacturers whose endeavor had been rather to copy the German product found themselves forced to modify their process, so as to produce a more soluble type. Therewith the toxicity of their products fell likewise to the lower level. When, under peace-time conditions, it became possible to follow more thoroughly the effects of treatment, it was reported from several sources to the Salvarsan Committee (appointed meanwhile by the Medical Research Council) that the curative action of the 914 products in use, which by that time had almost entirely conformed to the more soluble and stable type, was under serious suspicion of being inadequate. An investigation was therefore undertaken by those charged by the Medical Research Council with the duty of testing these remedies. They were able to use, with slight modifications, the method, then recently recommended by American workers, of evaluating the therapeutic power on mice infected with a strain of trypanosomes. They found indications of a pronounced inferiority in therapeutic action of the 914 products of this country, as compared with the original German product, or with the former output of some British manufacturers. The facts were fully presented to the manufacturers concerned; the latter, with their experience, were then able to produce preparations which, while retaining some of the advantages of rapid solubility, showed as good therapeutic qualities as the German preparation, according to the experimental indication, and still satisfied the official control as regards toxicity. These are the British products of the 914 type which are now being supplied.

The Need for Official Control of Products of the 914 Type.

"The result of this investigation made obvious the desirability of imposing, if possible, an official control of products of the 914 type for therapeutic potency, in addition to the existing one for absence of abnormal toxicity. The existence of the latter alone, in the case of a substance of ill-defined composition, such as 914, tempted the manufacturer to secure a smooth passage for his product, by slight changes in the process, which gave it regularly a lower toxicity than that which the test allowed. It was clearly desirable to make certain that, in so doing, he was not weakening its therapeutic action. Before steps in this direction could be considered, however, it was necessary to ascertain whether the difference in efficacy of different samples in removing trypanosomes from the peripheral circulation in mice corresponded with a clearly recognizable difference in their efficacy in removing the spirochetes from syphilitic lesions in the human patient. The following sections of this paper describe the details of the investigation, in which the same representative samples of the different types of product were compared both experimentally and clinically. It will be seen that, so far as the clinical observations permit conclusions as to relative therapeutic efficacy in syphilis, the results of the clinical trial are in full accord with the experimental estimates.

"The experimental work detailed in the following section has been carried out by Dr. Burn, Miss Durham, and Miss Marchal;

the clinical observations were made at the Rochester Row Military Hospital by Major White and Mr. Mills.

II. EXPERIMENTAL RESULTS.

By J. H. BURN, F. M. DURHAM, and J. E. MARCHAL.

"The experimental method used for estimation of the relative therapeutic value of different preparations of 914 is a modification of that recently described by Voegtlin and Smith (1920).¹ These workers determined the least dose of a preparation requisite to produce a certain effect on rats in which trypanosomiasis is developing. By counting the number of organisms per c.mm. in the tail blood of infected rats, Voegtlin and Smith were able to select animals suffering from the disease to the same extent, and were then able to compare the effect of different doses of the curative preparation. In our experiments the first results were obtained by the use of rats infected with *Trypanosoma rhodesiense*, and we observed, as did Voegtlin and Smith, the effect of a dose of 914 on the number of trypanosomes in the peripheral blood at the end of 24 hours. Our supply of rats ran short, however, and, as we were accustomed to use mice for the biological test for the toxicity of samples of 914, we determined to attempt to carry out the therapeutic test also on mice. About the same time, through the kindness of Prof. Mesnil, of the Pasteur Institute, we obtained a strain of *T. equiperdum*, and we infected mice with this species. We found mice much more convenient than rats for the therapeutic test; they were much easier to handle, and the procedure of intravenous injection into a large number of animals was much less exhausting. We made a further departure from the details described by Voegtlin and Smith in observing the effect of the curative dose until 72 hours had elapsed from the injection, for we found this to be a more suitable end-point than the shorter period of 24 hours. While the bulk of our work has been carried out on mice infected with *T. equiperdum*, observing the curative effect for a period of three days, it should be stated that we obtained closely similar results, using rats infected with *T. rhodesiense* and observing the therapeutic effect only for 24 hours.

"It will be sufficient to outline our procedure in the case of the experiments with mice infected with *T. equiperdum*. When the strain of this organism was first received, it was transferred to rats and passed through several animals of this species in order that a constant virulence might be obtained. The strain has been transferred from rat to rat ever since, and when we desired to carry out a therapeutic test, mice were infected from the blood of a rat by injecting into them intraperitoneally 0.1 c.cm. of an emulsion of the infected rat's blood in 1 per cent. citrate saline, such that the total number of trypanosomes received by the mouse was in the neighborhood of 7-8 millions.

Method of Experiment.

"For one experiment, as a rule, 30 mice were infected in this way, and two days later an attempt was made to select from the 30 mice those in which the infection had progressed to a sufficiently uniform stage. This was done by pricking the tail of each mouse and drawing up a drop of blood into a haemocytometer pipette exactly as in carrying out a red-cell count. As a diluent, Toison's fluid was used, to which a little formalin had been added. When the blood had been thoroughly mixed with the stain, a drop from the pipette was transferred to the counting chamber in the usual way, and after being covered with a cover-slip was allowed to stand for five minutes in order that the organisms present might settle down on to the floor of the chamber. These were seen, under the 1/6th mm. objective, to be sharply fixed and stained, so that their enumeration was as easy as that of the leucocytes. In our experience two days after infection, out of 30 mice about 20 contained trypanosomes in the peripheral blood in numbers varying from 100,000 to 500,000 per c.mm. Voegtlin and Smith found that in rats, for the purpose of comparing the therapeutic effect of doses of different sizes, animals whose blood contained 100,000 to 300,000 organisms per c.mm. could be regarded as being at a uniform stage of infection. A series of determinations showed us that in mice a dose producing a certain degree of curative action on animals containing 100,000 trypanosomes per c.mm. could exert the same effect on those containing as many as 500,000 per c.mm., but not on those in which trypanosomiasis had developed further, unless the dose were relatively large. Mice, in which the number of organisms lay within the limits 100,000 to 500,000 per c.mm., have, therefore, been regarded as infected to a 'standard' extent, and the use of mice with slightly larger numbers of organisms has been limited to the study of the effect of doses considerably greater than what we describe as the minimal curative dose.

"The various samples of 914 preparations examined have in every case been administered intravenously, a procedure very simple to carry out in mice by injection into one of the tail veins. The effect of the injection has been observed by microscopic examination for the presence of trypanosomes in drops of blood taken from the tail and examined fresh under 1/6th mm. objective. Such examinations of the blood were made 24, 48, and

72 hours after the injection of the drug. A certain convention was adopted in recording the results of the examination. In the fresh, living condition, trypanosomes are very easily detected, on account of the disturbance of red corpuscles due to their lashing movements. If systematic search through a drop of the fresh blood failed to reveal the presence of any trypanosomes, the result was recorded as 'nil.' This does not mean that we supposed that the animal had been rendered perfectly free from trypanosomes; but, as a matter of practical observation, we found that, at the end of 72 hours, the trypanosomes were either so abundant that they were readily found in a drop of blood, or so scarce that none were found. In the former case, the infection always showed a rapid re-acceleration of its progress, and the ani-

TABLE I.—Experimental Examination of Sample C1 of British Manufacture.

(A) = Mouse.			(B) = Size of infection before injection, in thousands per c.mm.			(C) = Dose of C1 calculated in mg. per g.			(D) = No. of trypanosomes present in peripheral blood after periods of hours.		
(A)	(B)	(C)	24 hrs.	48 hrs.	72 hrs.	(A)	(B)	(C)	24 hrs.	48 hrs.	72 hrs.
1	644	0.09	0	0	0	14	258	0.06	+	0	0
2	440	0.09	0	0	0	15	112	0.05	++++	+	0
3	884	0.08	0	0	0	16	272	0.05	++++	+	0
4	846	0.08	0	0	0	17	250	0.05	+	0	0
5	340	0.08	+++	0	0	18	238	0.05	+	0	0
6	300	0.08	0	0	0	19	360	0.05	+++	0	0
7	480	0.07	0	0	0	20	320	0.05	++++	+	0
8	440	0.07	+	0	0	21	323	0.04	++++	++++	D.
9	300	0.07	0	0	0	22	328	0.04	++++	++++	D.
10	236	0.07	++	0	0	23	294	0.04	++++	++	D.
11	214	0.06	++	0	0	24	270	0.04	++++	++	D.
12	160	0.06	+	0	0	25	194	0.03	++++	++++	D.
13	390	0.06	+	0	0	26	128	0.03	++++	++++	D.

D=dead.

mal died within the next two days. In the latter case, the trypanosomes were not discovered by the routine examination of one drop of blood for several days afterwards, and were usually not found for upwards of a week, the animal living for a fortnight or more longer. Although, therefore, the finding 'nil' does not represent an absolute cure, it does represent a sharply differentiated and easily recognized degree of therapeutic action. It was not difficult to determine the minimum dose which would regularly produce this effect. Throughout this investigation, the dose, determined for each preparation, has been the least dose

TABLE III.—First Comparison of British and German 914 Products.

(P) = Preparation.				(P) = Preparation.			
(Ma.) = Maximum tolerated dose.				(Ma.) = Maximum tolerated dose.			
(Mi.) = Minimal curative dose.				(Mi.) = Minimal curative dose.			
(RD) = Ratio of curative dose to tolerated dose.				(RD) = Ratio of curative dose to tolerated dose.			
(P)	(Mi.)	(Ma.)	(RD)	(P)	(Mi.)	(Ma.)	(RD)
German				British			
A1	0.02	0.3	1:15	C1	0.06	0.5	1:8
A2	0.02	0.3	1:15	C2	0.03	0.5	1:16
A3	0.02	0.3	1:15	C4	0.03	0.5	1:10
British				C5	0.04	0.3	1:7.5
B1	0.04	0.4	1:10	C6	0.04	0.4	1:10
B2	0.05	0.3	1:6				

which caused, within 72 hours, a disappearance, complete in the above sense, of trypanosomes from the tail blood of a mouse with a standard infection. Such a dose has been termed the minimal curative dose.

Description of Tables.

"We may first give in full detail the results of the examination by this method of two preparations, one of which is the German product, and the other a preparation of different make, purporting also to be 914, but showing a marked inferiority in therapeutic value when examined by the test. Each table is a compilation of data obtained in three experiments on three sets of infected mice. The second column in the tables gives the number of trypanosomes in each c.mm. of the tail blood of the mouse, which was found shortly before the injection was made. The third column expresses the dose administered in terms of mg. per

TABLE II.—Examination of Sample A1, which was Current Neosalvarsan of German Manufacture.

(E) = Mouse.			(F) = Size of infection before injection, in thousands per c.mm.			(G) = Dose of A1 in mg. per g.			(H) = No. of trypanosomes present in blood at a period (hours) after injection.		
(E)	(F)	(G)	24 hrs.	48 hrs.	72 hrs.	(E)	(F)	(G)	24 hrs.	48 hrs.	72 hrs.
1	436	0.06	0	0	0	12	178	0.02	0	0	0
2	422	0.06	0	0	0	13	177	0.02	+	0	0
3	400	0.05	0	0	0	14	175	0.015	+	0	0
4	396	0.05	0	0	0	15	170	0.015	++	0	0
5	340	0.04	0	0	0	16	674	0.015	++++	++++	D.
6	280	0.04	0	0	0	17	556	0.015	++++	+	0
7	220	0.04	0	0	0	18	536	0.0125	++++	+	0
8	248	0.03	+	0	0	19	520	0.0125	++++	++++	D.
9	196	0.03	+	0	0	20	423	0.01	++++	+	0
10	120	0.025	+	0	0	21	404	0.01	++++	+	0
11	104	0.025	0	0	0	22	12	0.01	++++	+	0
						24	100	0.01	+	0	0

D=dead.

¹C. Voegtlin and H. Smith: Jour. Pharm. Exper. Ther. 1920, xv., 475.

gramme of body-weight; while, so far as possible, mice were chosen of 20 grammes weight, the dose was always calculated so as to be proportional to their exact weight (to the nearest gramme). The last three columns give the result of the examination of a drop of fresh blood at the stated intervals after the injection. Roughly, the result recorded as ††† means that trypanosomes were present in the tail blood in numbers exceeding 500,000 per c.mm.; ††† indicates number from 100,000 to 500,000, and †† means an infection lying between 10,000 and 100,000; finally, † is used for less than 10,000 per c.mm.

"The result set out in Table I. of the examination of preparation C1, which was manufactured in this country, is seen to be that a dose of 0.06 mg. per g. removed all trypanosomes from the tail blood of each of the four mice in 48 hours, while, on the other hand, in 72 hours all mice receiving a dose of 0.04 mg. per g. were dead. The effect of a dose of 0.05 mg. per g. was intermediate. We take the figure 0.06 mg. per g. for preparation C1 and consider it to represent the 'minimal curative dose,' this being the least dose which removed trypanosomes from the blood of all mice within 72 hours.

TABLE IV.—Comparison of the German Product with the New British Products supplied to us by the Manufacturers after the existing inferiority had been pointed out to them.

	(P)	(Mi.)	(Ma.)	(RD)
A3 German		0.02	0.3	1:15
B3 British		0.015	0.3	1:20
C3 "		0.02	0.3	1:15

"In Table II. are given the results of preparation A1, which is a sample of the current neosalvarsan of German manufacture. In this table it is seen that for A1 the least dose which is able to cause the disappearance of trypanosomes from all mice in 72 hours is 0.02 mg. per g.

"In this way an examination of several 914 products was undertaken, several samples of each make being tested. Table III. sets out the results of this examination; in the second column it will be seen that the figure for the minimal curative dose of the German preparations is, in the case of each of the samples tested, 0.02 mg. per g. The figures for the other preparations are, with one exception, twice to three times as great, indicating an obvious inferiority in therapeutic value.

"The third column of Table III. gives the 'maximum tolerated dose' for the corresponding preparation. This, as mentioned earlier, is the largest dose which can be injected intravenously into each of five normal mice without causing death in more than one of them, and it forms an expression of the toxicity of the preparation. A comparison of the minimal curative dose with the maximum tolerated dose, such as is presented in the last column of Table III., shows that, as a rule, though not invariably, a fall in curative value is accompanied by a proportionally smaller fall in toxicity, but there is no close correspondence between the two indices.

"We may now draw attention to the results obtained by carrying out the therapeutic test on preparations furnished by British manufacturers after they were informed of the results already detailed. The results appear in Table IV. In the second column of the table the minimal curative dose of each preparation B3 and C3 is seen to be practically identical with that of the current German neosalvarsan, the figure for B3 indicating a slightly greater therapeutic value than that for A3.

"Finally we wish to state briefly that we have not discovered any differences by this method between the therapeutic value of different makes of 606, whether British or German. All give uniformly the value of 0.01 mg. per g. for the minimal curative dose, which may be compared with the figure 0.02 mg. per g. for the best 914 preparations recorded above.

"Six of the samples of 914 preparations experimentally tested were then chosen for a clinical comparison, the report of which is given in the next section. These samples are referred to in Tables III. and IV. as A2, A3, C2, C3, and B2, B3.

"It will be seen by reference to these tables that A2 and A3 are current samples of the German neosalvarsan. B2 and C2 are samples of British manufacture, taken from the period before the suggestion of defective therapeutic properties was raised. According to the experimental indications, as shown in the tables, B2 was seriously defective in therapeutic power, having only about two-fifths of the activity of the German samples, whereas C2 was chosen as being a particularly active sample of the British product at that period, its activity being, apparently, about two-thirds of that of the German product, as judged by the experimental test on trypanosome infection in mice. B3 and C3 are samples from the same two British sources as B2 and C2, but taken after the methods of manufacture had undergone modification, in accordance with the above indications. B3, it will be seen, is experimentally rather better than, and C3 approximately equal to A2 and A3 in therapeutic activity.

III. CLINICAL RESULTS.

By C. H. MILLS and C. F. WHITE.

FROM THE MILITARY HOSPITAL, ROCHESTER ROW, S.W.

"In view of the growing opinion which we have shared with

other clinicians that the recent endeavors on the part of the manufacturers to lessen the toxicity of the newer 914 preparations had to some extent also lessened their therapeutic properties, we readily complied with Dr. Dale's suggestion in carrying out these investigations in syphilitic patients, concurrently with a parallel series of experiments conducted in his department, in which the same preparations of 914 were used in mice infected with *T. equiperdum*.

"No experimental work hitherto carried out has been of sufficient importance to prove, or disprove, that the results obtained in treating trypanosome-infected mice with arsenobenzol form a true indication of the spirocheticidal value of such drugs in syphilitic patients. Opinion has leaned toward the assumption that no reliable comparison could be drawn between the results so obtained when dealing with different organisms in such different soils. We fully recognize that the number of cases employed is small, but we have taken the view that the results obtained in a very thorough investigation upon a few cases are usually of more scientific value than those obtained in a larger total under a less rigid scrutiny. Again, a very obvious source of error is the varying degree in which the different individual syphilitic lesions—even in the same patient—are affected by an intravenous injection of an arsenobenzol preparation. The main factors in such variation are probably the rate and amount of penetration of the derivative of the drug into such lesions. One would arrive at a very inaccurate deduction in comparing the effect produced upon spirochaetes protected in the depth of a density indurated and avascular chancre, on the one hand, with that produced on spirochaetes in an early, superficial, vascular and therefore more permeable lesion, on the other. With this in view, an endeavor has been made, in the majority of primary cases, to select only those in which the characteristics of the chancre most nearly approached a clinical uniformity.

"In our series of syphilitic patients (Table V.) cases were chosen presenting readily accessible surface lesions, and in every instance the *S. pallida* was demonstrated by dark-ground illu-

TABLE V.

(1) Preparations A2 and A3 (0.45 g. injected intravenously); current German samples. Minimal curative dose for mice 0.02 mg. per g. (high activity).

Case No.	Syphilis present: duration in weeks.	<i>S. pallida</i> detected on dark-ground examination: hours after first injection.		
		18-20.	48.	72.
1	Primary, 4-5.			
	S.P., chancre coronal sulcus.	0	0	0
2	Primary, 4-6.			
	S.P., chancre coronal sulcus.	0	0	0
3	Secondary (clinical relapse) after 914.			
	S.P., papule anus.	0	0	0
4	Primary advanced, plus gonorrhoea, 4-5.			
	S.P., chancre fraenum.	0	0	0
5	Secondary (clinical relapse).			
	S.P., fissure prepuce.	0	0	0
6	Primary, 4-6.			
	S.P., meatal sore.	0	0	0
7	Secondary, 26 (approx.)			
	Condylomata.	Present	Present	Present
8	Primary advanced, 4-5.			
	S.P., chancre prepuce.	0	0	0
9	Primary, 4.			
	S.P., abundant chancre coronal sulcus.	0	0	0
10	Secondary, 7-8.			
	S.P., chancre fraenum.	0	0	(?)*

Preparation, Cases 1 to 4: A2. Cases 5 to 10: A3.

S.P. = *S. pallida*. *Patient not available; in detention.

Remarks.—In only one case out of 10 could *S. pallida* be detected in 18-20 hours after an intravenous injection of preparations A2 and A3. It was again detected 48 hours after injection, but was not detected 96 hours after injection.

(2) Preparation B2 (0.45 g. injected intravenously). Minimal curative dose for mice 0.05 mg. per g. (low activity).

Case No.	Syphilis present: duration in weeks.	<i>S. pallida</i> detected on dark-ground examination: hours after first injection.		
		18-20.	48.	72.
1	Primary advanced, 4 (?)			
	S.P., abundant in chancre, skin, body of penis.	Present	0	0
2	Primary advanced, 6.			
	S.P., chancre prepuce.	0	0	0
3	Primary advanced, 3.			
	S.P., chancre prepuce.	Active and abundant	Active	0
4	Secondary advanced, 26.			
	Condylomata anus.	Abundant	Active	Active*
	S.P., chancre coronal sulcus.			
5	Secondary advanced, 9-12.			
	S.P., papule abdomen.	0	0	—
6	Secondary (clinical relapse after treatment).			
	S.P., papule scrotum.	Active	0	—
7	Primary, 4-5.			
	S.P., chancre prepuce.	Numerous and active.	Scanty	0
8	Secondary, 26.			
	S.P., left shoulder.	Active and abundant	Active	0

9	Secondary (clinical relapse 4 years after 606). S.P., papule mucous membrane prepuce.	Active	0	—
10	Primary, 5. S.P., chancre mucous membrane prepuce.	Active	0	—

Remarks.—An injection of 0.45 g. preparation B2 (intravenous) failed to destroy *S. pallida* in surface lesions in 18–20 hours in eight out of 10 cases.

*None detected 168 hours after first injection.

(2) Preparation B3 (0.45 g. injected intravenously). Minimal curative dose for mice 0.015 mg. per g. (high activity).

Case No.	Syphilis present: duration in weeks.	<i>S. pallida</i> detected on dark-ground examination: hours after first injection.	
		18–20	48, 72, and 96.
1	? Recurrence in 13 months after 914. S.P., chancre mucous membrane of prepuce.	0* (2 exams.)	0
2	Primary, 5. S.P., chancre coronal sulcus.	0 (2 exams.)	0
3	Primary, 4. S.P., chancre coronal sulcus.	0 (2 exams.)	0
4	Primary, 5. S.P., chancre, skin, body penis.	0 (2 exams.)	0
5	Primary, 6. S.P., chancre coronal sulcus.	0 (3 exams.)	0
6	Primary, 5. S.P., chancre coronal sulcus.	0 (3 exams.)	0

Remarks.—*S. pallida* could not be detected in 18–20 hours after an intravenous injection of 0.45 g. preparation B3 in six out of six cases.

*None detected 48 hours after first injection.

(3) Preparation C2 (0.45 g. injected intravenously). Minimal curative dose for mice 0.03 mg. per g. (moderate activity).

Case No.	Syphilis present: duration in weeks.	<i>S. pallida</i> detected on dark-ground examination: hours after first injection.	
		18–20.	48, 72, and 96.
1	Primary, 4. S.P., papule prepuce.	Present.	0
2	Primary, 4–5. S.P., chancre fraenum.	Present.	0
3	Primary, 4. S.P., sore coronal sulcus.	Present.	0
4	Secondary, 10 (approx.). S.P., in sore junction penis and scrotum	0 (7 exams.)	0
5	Secondary, 10 (approx.). S.P., chancre fraenum.	0 (5 exams.)	0
6	Secondary, 10 (approx.). S.P., in metal sore.	0 (4 exams.)	0

Remarks.—In three out of six cases *S. pallida* was detected in 18–20 hours after an intravenous injection of 0.45 g. of preparation C2.

(5) Preparation C3 (0.45 g. injected intravenously). Minimal curative dose for mice 0.02 mg. per g. (high activity).

Case No.	Syphilis present: duration in weeks.	<i>S. pallida</i> detected on dark-ground examination: hours after first injection.		
		18–24.	48.	72.
1	Primary, 4. S.P., chancre fraenum.	0	0	0
2	Primary advanced, 5. S.P., chancre coronal sulcus.	0	0	0
3	Primary, 5. S.P., chancre coronal sulcus.	Present.	0 (2 exams.)	0
4	Secondary, 8. S.P., chancre, skin, body of penis.	0	0* (3 exams.)	0
5	Secondary, 13 (approx.). S.P., condylomata anus.	0 (3 exams.)	0	0
6	Secondary, 8. S.P., Rt. buttock and papule scrotum.	0*	0	0

*Buttock and scrotum. †Gland puncture and chancre

Remarks.—In one out of six cases *S. pallida* could still be detected after an intravenous injection of 0.45 g. preparation C3.

mination by one, and frequently both of us, in such lesion as was selected for the investigation, prior to the administration of the 914 injection; also the examination for spirochaetes in the lesions subsequent to the injection of the drug under investigation was very thorough. It was not until several specimens taken from the depth of such lesions had been carefully examined for spirochaetes by dark-ground illumination with negative results that 'none detected' was recorded.

"The dose in each series, and in every case, was 0.45 g. dissolved in 10 c.cm. *Aqua dest.*, and was administered intravenously. The subsequent examinations for spirochaetes were carried out 18–20, 48, and 72 hours after each injection. By the term 'duration' is meant the time that elapsed since infection to the date of the first injection.

IV. CONCLUSIONS.

"Putting together the results obtained by experimental and clinical testing of the preparations which were submitted to both kinds of examination, we obtain the comparison shown in Table VI. The clinical observations which enable a differentiation to

TABLE VI.

Preparation.	Minimal curative dose for mice infected with <i>T. equiperdum</i> .	Proportion of human cases in which spirochaetes were detected 18–20 hours after injection of 0.45 g.
	0.015	0 out of 6
B3	0.02	1 out of 6
C3	0.03	3 out of 6
B2	0.03	9 out of 10

be made are the examinations for the presence of spirochaetes made 18–20 hours after the administration of the dose of 0.45 g. Ideally the effects of lower doses should have been compared at later periods after administration, but the number of suitable cases available made this impracticable. With the chosen dose of 0.45 g., the examinations at later periods obviously had relatively little significance. Even with the worst of the preparations the spirochaetes had been so affected by the third or fourth day that they were no longer discoverable in the superficial lesions. On the other hand, the experimental results showed that the effects of larger doses 24 hours after administration afforded a less regular basis of comparison than those of smaller doses after 72 hours. In comparing the experimental findings with the clinical, therefore, we are frankly comparing the results of estimates made on two different bases. When it is further remembered that, with all the care exercised by the clinical workers in the selection of cases, nothing approaching uniformity of the experimental infection could be expected, the correspondence of the two sets of results is surprisingly good. In no case does a preparation, giving evidence of weaker action by the experimental measurement, make as good a showing, by the widely different clinical method of appraisal, as one which is experimentally its superior. If the preparations are arranged in their order of activity by the two methods, the orders are identical. No closer correspondence could be expected under the conditions of the comparison, and the correspondence obtained is so good as to justify, in our opinion, the conclusion that the determination of the therapeutic action on mice infected with trypanosomes is, at least, a very valuable index, if not an accurately quantitative measure, of the therapeutic activity of different samples of a preparation such as 914 on syphilis in man. The method has, accordingly, been put into routine use in the Medical Research Council's Department of Biological Standards at Hampstead, an occasional check of therapeutic activity being thus imposed, in addition to the regular testing of every batch of such products for absence of undue toxicity."

A Comparative Study of Syphilis in Whites and in Negroes

E. L. Zimmermann has undertaken a comparative study of syphilis in whites and negroes for the purpose of emphasizing inherited racial differences in response to syphilitic differences. The study is based on material from the Johns Hopkins Dispensary, a free clinic treating approximately 60 per cent. negro and 40 per cent. white patients. One thousand eight hundred forty-three cases were studied; of this number there were 596 white males, 521 colored males, 297 white females and 429 colored females. Age of initial infection lower in negroes, especially women.

Of 27 extragenital chancres, only 5 occurred in colored patients.

Of 228 white patients with early secondary syphilis only four presented an iritis, while of 279 negroes there were thirty-six cases. Seventeen of these were associated with follicular syphilis. Secondary lesions of the buccal and pharyngeal mucous membranes exclusive of diffuse erythema occurred in 42.1 per cent. of the white patients and 27.2 per cent. of negroes. The incidence of moist papules and condylomas among white males and females was 11.8 and 26.3 per cent. respectively; among negro males and females, 17.7 and 52.2 per cent. respectively. Macular and maculopapular syphiloderms composed 70 per cent. of eruptions in white patients and 35 per cent. in the negro patients. Recurrent bone pains are more frequent in negroes.

Tertiary syphilis occurred in 17.5 per cent. of white and 14.5 per cent. of negro patients. Among white patients neurosyphilis exceeds bone syphilis in frequency, while in negroes, the latter is the most common form of tertiary syphilis.

Aneurysm occurred in fourteen negroes and in six white patients. Of 29 cases of adenitis, 23 occurred in negroes. Leukoplakia occurred in 8 white males, one white female, and in 2 colored males.

Neurosyphilis occurred in 45.3 per cent. of the white patients, the most common form of late syphilis in this race. Cerebrospinal syphilis in negroes is more liable to assume the endarteritic form. Tabes was found in 94 whites and 14 negroes. Paresis, 20 whites, 4 negroes.

Author concludes that there exists inherited biologic differences between white and negro patients as regards syphilitic infection.—(*Arch. Derm. and Syph.*, July, 1921.)

The Physician's Library

Practical Therapeutics. By Hobart Amory Hare, M.D., Professor of Therapeutics, etc., of Jefferson Medical College. 18th Edition; 1,038 pages. Philadelphia and New York: Lea & Febiger, 1922.

Every once in so often it is our pleasure and privilege to present to the readers of THE MEDICAL TIMES a new volume of this therapeutic masterpiece. No therapist in modern times has attained the eminence of the author of this book. It is hard to say whether his high standing is due to his book, or vice versa, but the fact remains that we have in this work on therapeutics a volume which is without equal in the English language. Each edition is a little better than its predecessor, for the reason that Dr. Hare not only brings each edition up to date but introduces everything that is new in modern therapy.

The 18th edition has been most thoroughly gone over and there have been omissions and commissions as the conditions have warranted. It is not necessary to commend this book to the attention of the medical profession, because it is known to all physicians, but is a pleasure, nevertheless, to bring this new edition to the attention of our readers and to particularly suggest it to young medical men who are just entering upon practice.

Practical Organotherapy. By H. R. Harrower, M.D., 416 pages; 3rd Edition. Glendale, Calif.: Harrower Laboratory, 1922.

In discussing this book we need not go into the matter of endocrinology. A few years ago this subject was laughed out of court. Today it has been accepted as a definite "ology" and an increasing number of medical men are basing their therapeutics in practice upon the knowledge gained of the endocrines during the last decade.

One of the pioneers in this work is the author of this book and he has gone into the subject most carefully and in great detail. Every subject is studied from the standpoint of physiology, diagnosis and therapy, and it is safe to say that there is very little in endocrinology which has not been thoroughly and properly covered in this volume. That it will prove popular with more and more men all the time is self-evident and we are glad to recommend it to those men who are interested in the study of this fascinating subject.

Hay Fever and Asthma. By William Scheppegegrell, M.D., President of the American Hay Fever Prevention Association; 275 pages. Philadelphia-New York: Lea & Febiger, 1922.

The apparently increasing number of people suffering from conditions akin to hay fever make a book of this nature exceedingly essential. It is, therefore, fitting that a man of the eminence in this specialty as the author should assume such authorship.

We now believe that hay fever is due to pollen and, with this as a premise, Dr. Scheppegegrell has gone very carefully into the details of the plants which produce the condition in the Eastern, Southern, Rocky Mountain and Pacific cities, and he also demonstrates those plants which are not responsible for hay fever. After discussing the anatomy and physiology of the nose he takes up the etiology of hay fever; discusses the pollens with their reactions, etc.; classifies the hay fever plants; tells how the disease may be prevented, and goes into the treatment and immunization.

The book covers the subject in a most thorough manner and it will appear as a haven of refuge to many a physician who has had such difficulty heretofore in caring for his hay fever patients.

As is usual with books appearing from this publisher, the volume is very handsomely put out.

Clinical Laboratory Methods. By Clyde L. Cummer, M.D., of Western Reserve University; 484 pages. Philadelphia-New York: Lea & Febiger, 1922.

The author has given with great care and detail the explanation of the various laboratory methods which would prove of interest to the student and practitioner. He discusses the examination of the blood; of urine; of gastric and duodenal contents; of feces; of sputum, and of body fluids, and then takes up the various bacteriological methods. The subject is the most carefully covered and it would be difficult indeed to pick any flaws in the way the matter has been handled. We can imagine that physicians will welcome this book on account of the clearness of its exposition.

The Place of Version in Obstetrics. By Irving W. Potter, M.D., F.A.C.S., Buffalo, N. Y. St. Louis: C. V. Mosby Co., 1922.

This book begins with a rather elaborate history of version dating from the time of Soranus and Aetius on through the days of Roeslin, Pare, Baudelocque and others up to the present generation of obstetricians.

The author describes and beautifully illustrates both by pho-

tographs and drawings, his technic of version, a procedure which he has accomplished four thousand times. In his opinion the procedure is simple, when properly done, under aseptic surgical precautions, lessens the maternal pain and morbidity, shortens the stage of labor, diminishes maternal and fetal mortality, and finally, he feels that it has a much greater field of usefulness in obstetrics than has ever been conceded.

The book has been written by one who has worked faithfully in the cause of his conviction against all criticism and who has accomplished a great deal in aiding womanhood in that hour of greatest pain.

Practical Infant Feeding. By Lewis Webb Hill, M.D., Junior Assistant Physician to the Children's Hospital, Boston; Assistant in Pediatrics, Harvard Medical School. 483 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1922.

The belief that many physicians treat babies from a dietetic standpoint without a careful understanding of their treatment, has led the author to produce what can be regarded as a very practical book for the practitioner. Hill feels that the physician should know the chemistry of metabolism in both normal as well as abnormal babies and proceeding from this premise, he has built up a work which should be a landmark to those men who have to advise mothers regarding the successful feeding of their children. In short, he has applied scientific principles to practical work without leading the reader through a maze of scientific matter which in so many instances is "over the head" of the average reader.

He discusses his subject with minuteness, going into the physiology and pathology of digestion and nutrition; human milk; breast feeding; artificial feeding; cow's milk; modified milk; digestive and nutritional disturbances in bottle-fed babies, as well as the great variety of diseases to which infants are subject.

There need be no hesitation on the part of any physician interested in this work in reading this book, because he cannot help but find therein a wealth of valued information.

The Thyroid Gland. Clinics of George W. Crile, M.D., and Associates at the Cleveland Clinic. 228 pages, with 106 illustrations. Philadelphia and London: W. B. Saunders Company, 1922.

Sixteen contributors, including Dr. Crile, have made this book one of intense interest to all men interested in the thyroid, and we can safely say that the book is the last word on this fascinating subject. It is based upon the work done by Crile and his associates in Cleveland and discusses the topic in minute detail.

The authors take up the effects of iodine in this condition and specify that after the age of 25 iodine possesses little value as a curative measure. They believe the body is an electro-chemical mechanism in which electric conductivity is controlled by the thyroid. This proves to the authors the cause of the different types of goitre, such as exophthalmic, myocardial and cardiovascular. As may be expected, the authors go into the surgery of the thyroid most carefully and they unhesitatingly advise surgical treatment for all cases without regard to the degree of hyperthyroidism.

The text, illustrated by a splendid array of unusually good pictures, is most delightful and the book is highly to be commended.

Diseases of the Digestive Organs. By Charles D. Aaron, M.D., F.A.C.P., Professor of Gastro-enterology in the Detroit College of Medicine; 3rd edition; 904 pages. Philadelphia-New York: Lea & Febiger, 1921.

The third edition of this book, which has been brought up to date, is of value because the book itself bears with particular emphasis upon the importance of diagnosis and treatment. It is only within recent years that physicians have acknowledged the real necessity for a special branch of medicine under the name of gastro-enterology and the great number of diseases discussed in the 900 pages of this work indicates that the specialty is an essential one.

The book begins with diseases of the mouth and ends with those of the anus. It takes up the physiology of digestion from the clinician's standpoint and gives scant attention to the physiology that we usually get, that is, from the physiologist's point of view. He discusses gastric functions; explains the various tests; shows how to use the duodenal tubes in the various ways they are now employed; devotes some space to the x-ray, which is the gastro-enterologist's right-hand in diagnosis; gives a careful exposition of dietetics, hydrotherapy, gastric neuroses; goes into the functions of the liver and pancreas in metabolism, and, in short, covers the whole range of gastro-intestinal disturbances from alpha to omega.

The book is distinctly creditable in every way and is a valued addition to the armamentarium of the medical man.

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Genius at Bay

If genius is a neurosis, as has been plausibly argued, then some interesting questions may be postulated in the light of new knowledge in the psychologic sphere.

Hitherto, the genius either did not know that there was anything the matter with him, or if he suspected that there was he had no idea as to its nature. Other people said that his gifts were from God—or from the Devil. But nowadays we account for him with equal glibness, in another way; we say that he is a neurotic, and we furnish him with a set of Freudian complexes that would put an Oedipus to shame.

Now we don't believe that geniuses of an older day tried to understand themselves; they just pegged away at their marvelous creations and made the most of life without inquiring too closely into the reasons why of their unconventional activities; and it wouldn't have done them any good if they had, for men had not then gone beyond God and the Devil in their thinking; Freud was born late, and our ancient geniuses were deprived, as it were, of his services.

The point to which we are leading up is this: the genius of to-day can hardly escape "contamination" by the Freudian lore which drips from everybody's tongue and pen. Will it not prove to be a tanglefoot influence? When your genius becomes self-conscious and censorious about his mechanisms will he not cease to be an honest-to-goodness genius? How can a potential Shelley, wrastlin' with something on the Skylark order, forget his complexes long enough to turn out an ode of immortal quality? Let us suppose that he starts in with an inspired line or two comparable to those with which Keats begins the Grecian Urn; at that point Keats was no longer a man, but a veritable god; at the same point our present-day genius will realize that it is only some

darned homosexual complex that is attempting to order his fancies and he will not be able to capitulate to it quite completely enough to give us another Grecian Urn.

That is the point. How can there ever be another Grecian Urn?

This Freudian stuff defeats that which it attempts to elucidate. It is a Frankenstein. It hampers the divine fermentation that begets great art.

Suppose that Leonardo da Vinci had understood that his mother-love complex was at the bottom of all his extraordinary mechanisms, and suppose that he had realized all the morbidity and abnormality of his obsession—is it likely that he would have yielded to it so completely as to achieve all that we know as the product of his brain and hand? Do not such things depend, after all, upon one's sublime unconsciousness of the workings of creative mechanisms?

Truly our civilization seems to carry within itself all the germs making for its own destruction.

Today we understand the reasons for everything—which may be why we are at such a standstill in the world of art.

It would require a genius to show us the way out of such a dilemma. How can the *reductio ad absurdum* be escaped?

Radicals Unrecognized as Such

We talk about radicals, having in mind persons whose political or economic views and practices are opposed to what most of us consider rational. Yet consider what conservatives such people are when compared with the followers of cults which deny the reality of disease. Isn't it about time to regard such citizens in their true light—as radicals?

We are not at all in favor of persecuting such people, but we believe that there should be no misunderstanding as to their status. There is no radical in the country who has anything on the individuals who insist that there is no such thing as disease.

How inconsistent the American people are. They have deported poor wretches of no potentiality for harm when compared with those radicals whom we are considering. They have silenced and imprisoned and abused, as dangerous to the country, thousands of political and economic agitators whose radicalism has been a feeble thing when measured by the terrific standard which denies the reality of disease.

We are not counselling hatred, but pity. These freak medical radicals are sick. Persecution is founded upon panic, and panic facilitates autocracy in the guise of "protection." The world has seen quite enough of that sort of thing.

Nevertheless, this slimiest of all phases of radicalism must be seen in the right light.

Hygiene and Humor

We are supposed to have, as a nation, a marked *flair* for humor, but in the adverse criticisms which one encounters in the lay and medical press of things which are believed to be inimical to the people the savage rather than the facetious predominates, despite the greater effectiveness of ridicule. Who ever saw these matters dealt with in a humorous vein? We are as deadly in earnest about most matters of the kind as the Irish are about politics. This attitude is pre-eminently the case in matters pertaining to health, whether it be health insurance or pepsodent or chiropractic. It was therefore with much surprise that we encountered the other day a witty fling in *Film Fun*, on the cover page, against the prevailing mode of advertising cigarettes. "Zuleika Cigarettes—they Stupefy," ran the jest. If all the money now disbursed by the propagandists against the

hated "pink stick" were to be expended through agents with a genuine sense of humor we should begin to fear even for the supremacy of the "coffin nail." But our fanatics may be trusted never to avail themselves of the most potent polemic weapon of all. They cannot be weaned of their incorrigible solemnity and ill nature any more than of their instinct for direct suppression of that which to them is taboo.

The people at large are undoubtedly very amenable to education in hygiene through humorous appeal, but it is a neglected field. Instead of solemn diatribes against the freak cults we should have "Sonnets of a Chiropractor" and "Songs of a Boob-Bumper." What is the matter with the professional humorists, with such rich soil lying fallow? They should not need even the subsidies of the propagandists, for an audience greedy to reward awaits them, thwarted but still hopeful and hungry for pabulum which new O. Henry, Cobb and Irwin types ought to provide.

The Private Room a Menace

Better ventilation alone would make a stay in a hospital ward preferable to a sojourn in a private room. The miserable cubicles for which patients have to pay eight dollars or more a day are positively inimical to health. Let the door of such a room be closed and asphyxiation begins. The protracted convalescence of many patients in these rooms constitutes no mystery except to the stupid physicians and surgeons who seem oblivious to their unhealthfulness.

We have no doubt whatever that in some of the cases ending fatally this factor plays a part.

The Evolution of Sexual Selection

One occasionally sees, even at this late day, examples of the over-feminized woman once the delight—and at the same time the object of contempt—of the opposite sex. There was a time when through sexual selection among the master class this breed of human females was "cultivated." We encounter the type in the pages of the older novelists. Anatomically she was a degenerate specimen, judged by any normal standard. She was small and soft, with tiny feet, ample mammae and pelvis, weak muscles, and a generally tender make-up. The less said about the mind of this creature the better. To-day she appears rather rarely, sometimes with the old type of mind, sometimes, paradoxically enough, as a hard-boiled radical, but always as an atavistic anomaly.

It was this freak who was chiefly responsible for the low esteem in which her sex was held by virile and capable men, who at the same time were sentimentally and sexually fascinated by her. All the romance and chivalry and folderol regarding women revolved around this doll, and to her is traceable all the traditions and customs that have taken so much time and trouble to smash in the cause of human progress.

Man is only satisfied to-day with normal women in-so-far as he has freed himself, or been freed by the more intelligent half of the race (the women themselves), of his lingering prejudices, the heritage of base human concepts in a more primitive age.

Sexual selection to-day, on the part of enlightened men, revolves about normal womanhood.

Thus is born a new aristocracy.

The first recorded cure of leucocythaemia (leukaemia) was published in 1845 by John Hughes Bennett (1812-1875), English physician and pathologist.—(*Med. Facts.*)

Baer's vesicle (a Graafian follicle with the contained ovum) was named for Karl Ernst Von Baer (1792-1876), German biologist, whose great discovery of the human ovum is the subject of his "Epistola de Ovo Mammalium et Hominis Genesi" (Leipzig, 1827).—(*Med. Facts.*)

Miscellany

CONDUCTED BY ARTHUR C. JACOBSON, M. D.

Medicine in the Movies

We have been greatly impressed by the remarkable manner in which ill or injured people are restored in the movies to health and vigor by the ministrations of the film doctor or Samaritan. The recoveries of those presumably suffering from surgical shock are especially noteworthy. Someone falls or is pushed off a cliff, is dropped from a balloon, or is shot to pieces. A glass of water is handed to him and he promptly resumes his activities. It is a marvelous remedy.

But when you think about it does it not align itself with all the other unrealities of the films? The episode of the glass of water strikes us forcibly because we are physicians who know how people really behave when injured or ill, and who know the difficulties of actual practice. The psychologist, the lawyer, the clergyman, the artist, the engineer and the physicist in the movie audience also have reactions peculiar to themselves and similarly activated by the absurdities of the films, which seldom seem to mirror life truly except by accident.

The art of the stage in general seems to conceive its function to be the creation of an unreal world. Normal persons do not behave under stress and strain like our emotional actresses, and insanity as feigned by actors is something unknown to psychiatrists.

Which reminds us of Galsworthy's "Pigeon." In that play a philanthropist is given to inviting starving persons into his home and establishing sympathetic and intimate relations with them. They stagger in exhausted and are invariably given a cup of tea; only a cup of tea—nothing else. The philanthropist supports the drooping wretch while he administers the tea, after which the latter completely revives and tells the story of his life at great length. Tea has remarkable food value—on the stage.

Dramatists and scenario writers apply the thought of old Omar and remould the world according to their hearts' desire—and the exigencies of their artificial stage craft. That they hold the mirror up to nature we deny. Life is never as they portray it.

The secret is that life cannot be portrayed. It must be lived.

Myocardial Degeneration in Congenital Syphilis

Alfred Friedlander called attention to the fact that congenital lues is in many cases the cause of such degeneration. There was no typical form of myocarditis which can be recognized as luetic. Notes the rapid improvement of cardiac condition in these cases under antiluetic treatment. Antiluetic treatment was suggested in myocarditis in young children irrespective of a positive Wassermann test and regardless of the fact that other definite signs of congenital lues were lacking.

Dr. Borden S. Veeder said that in his experience in seeing about 500 cases of syphilitic children he had seen only one aneurysm, he found that simply finding the spirochete in heart disease did not necessarily mean that the condition was due to syphilis.—(*Med. Rec.*, October 15, 1921.)

Vaccine and Serotherapy in Gonorrhea

Frassi's monograph won the Paravicini prize. It is based on 146 cases of gonococcus orchitis-epididymitis treated with vaccine, 23 cases of joint complications, and other material, and the conclusion of the experiences of others the world around. Everything tends to confirm, he says, the great value of vaccine and serum in the diagnosis and treatment of the surgical complications of gonorrhea, especially when used in connection with surgical measures. Autoserotherapy is giving good results, he states. The pain and swelling in a joint may be relieved by a single injection, but the complete cure usually required from four to eight weeks, sometimes supplemented by other measures, especially radiotherapy.—(*Archiv. Ital. di Chir.*, Bologna, July, 1921.)

X-RAY AND CLINICAL FINDINGS IN NORMAL CHEST OF CHILDREN—6 TO 10 YEARS

The National Tuberculosis Association sometime ago began a new and important phase of its work in an attempt to increase the quantity and character of research work in problems related to its own field in the United States. For this purpose it appropriated \$20,000 and appointed a small committee composed of Dr. Wm. Charles White, Medical Director of the Tuberculosis League of Pittsburgh, Dr. Paul A. Lewis, Director of Laboratories of the Phipps Institute, Philadelphia, and Dr. Allen K. Krause, Director of Kenneth Dows Research Fund, Johns Hopkins Hospital, to expend these funds to the greatest advantage.

This committee decided that the best use of these funds would be in assisting researches already under way that held the greatest promise of increasing the practical knowledge of physicians dealing with tuberculosis. This, they considered, would bring the greatest help to those suffering from tuberculosis and the greatest boon to the public from whom the funds were collected. This plan has been carried out in co-operation with the universities.

One of the researches was an effort to establish the x-ray and clinical findings in the chest of a normal child up to ten years of age. For this problem the National Tuberculosis Association nominated the following groups of roentgenologists and clinicians: Dr. H. K. Pancoast and Dr. H. R. M. Landis, University of Pennsylvania; Dr. F. H. Baetjer and Dr. C. R. Austrian, University of Johns Hopkins; Dr. H. K. Dunham and Dr. K. D. Blackfan, University of Cincinnati.

The signed reports of these physicians is here presented in two sections with the hope that they may promote a discussion which will be fruitful in establishing the truth in these two fields.

The value of roentgenography in determining the presence of pulmonary disease has long been recognized. Studies to determine the roentgenograms of various pathological lesions of the lung have been almost without number, yet much difference of opinion exists in the interpretation of findings, largely because no satisfactory observations have been made establishing the variations that may occur in the normal. To one observer, shadows noted are indicative of disease; to another they are not evidence of a pathological process; to one, they represent lesions of clinical significance; to another, they suggest changes of no moment. The realization of this unsatisfactory state of affairs was widespread but it remained for the Research Committee of the National Tuberculosis Association seriously to consider it and to set about to correct the shortcomings.

In the spring of 1920, that Committee called together the collaborators in this work and instructed them to set about in ways of their own choosing to solve the problem, extended to them a financial grant and in order that the problem might be a very definite one, asked that the immediate study be limited to a consideration of the chests of normal children between the ages of 6 and 10 years. The work was begun promptly and a preliminary report was made at the annual meeting of the Association in May, 1921. The findings at that time were incomplete and because of the then limited observations, no very definite conclusions were drawn. However, the prac-

tical need of a solution of the problems was apparent. Study was continued throughout 1921 and the first four months of 1922, and the data independently assembled were jointly discussed to value them. Although each pair of workers carried on its investigations without intergroup consultation, although each approached the subject from a different angle and when first met held views apparently not altogether in accord, it was agreeable to find that an exchange of conclusions disclosed almost an unanimity of opinion. The findings of these six observers—three clinicians and three roentgenologists—are presented to you for your consideration:

Theoretically, the normal child is one of ideal height, weight and development for his age, without subjective or objective evidences of deformity or of disease and without residual changes due to antecedent pathological processes. Practically, a normal child is one of average height, weight and development for his age, symptom-free and without signs of disease. Each such individual, in more or less relation to his age, will have been ill more or less often and as a consequence may be expected to show variations from the ideal, not because of present disease, but as a result of residual changes that persist. An appreciation of these facts makes it apparent that the findings, clinical and roentgenographic, in normal children as we meet them will vary greatly from any fixed standards and still must be considered as variants of normal.

The clinical data dealt with in this report were obtained by careful examination of apparently healthy children between the ages of 6 and 10 years. All children who showed signs of disease were excluded from the series. Individuals from various strata of society, foreign and native born, residents of urban and of rural communities, school children and children residing in institutions, children exposed to tuberculosis and some without a history of such exposure, children with and without a history of previous infectious diseases, all symptom-free and of an approximately normal height and weight for their ages, were studied. A history of each individual was recorded and in making the examinations of the chest, care was always observed to have the child relaxed and to see that no cramped or unnatural posture was assumed, for, as is well known, faulty position may lead to findings that cause confusion in interpretation. In addition, a tuberculin test was made on every child. The clinical data were then assembled and after the roentgenologist had interpreted his plate independently, the clinical and roentgenographic findings were correlated.

In all, over 500 children were thus studied and as a result some definite conclusions seem warranted.

As in the adult, so in the child vocal fremitus is more marked over the right upper chest than over the left.

It is generally stated that the percussion note elicited over the lungs of normal children within the age limits under consideration, is fuller, more tympanic, of higher pitch and more resilient than that noted over those of adults, and that frequently the tympanic quality is quite outspoken, especially over the lower lobe of the left lung. Although in general our observations confirmed this view, we have been impressed by the fact that in an appreciable number of such children, the note obtained on percussion over the lungs is indistinguishable in quality

from that elicited over the lungs of normal adults and that the usual resilience of the note is lacking. These findings in many instances have an analogue in shadows noted in the X-ray films, shadows indicative of increased density along the bronchial tree, similar to those seen in the plates of normal adults. This correlation of the findings on physical examination and on X-ray study is more constantly possible in studies of the upper half of the chest. When minor changes, similar to those discovered by X-ray examination of the upper lobes, occur in the bases, they usually escape detection on physical examination. In those instances, in which no shadow is found to explain the deviation of the note from the generally accepted one, it is our belief that the lack of resilient quality may be due to a decreased elasticity of the chest wall.

The so-called tympanitic quality of the percussion note over the left base may be increased, decreased or be entirely lacking, depending upon the degree of distention of the stomach or colon, the curvature of the spine, and may likewise vary with the position of the diaphragm or with the posture of the child during the examination. The note over the upper thorax is often the same on the two sides. Kronig's Isthmus averages 5 to 6.5 cm. in width. The lower margins of the lungs posteriorly are at the level of the 10th and 11th rib and descend from 1.5 to 3.5 cm. during forced inspiration.

A just detectable diminution of resonance over the apical regions is of no significance unless associated with a modification of the breath sounds in those areas or with other abnormal auscultatory findings.

It is generally accepted that normally in childhood, the breath sounds have a harsh, sharp character, with expiration longer and better heard than in the normal adult. This so-called puerile breathing is physiological and though it may seem trite, let it be emphasized that this exaggerated vesiculo-bronchial respiratory murmur, especially well heard in the areas overlying the great bronchi (i.e. anteriorly at the level of the first interspace and the second rib just lateral from the sternal margins, and posteriorly, particularly on the right side, at the level of the 2nd to the 4th spine) is often incorrectly interpreted as evidence of pulmonary disease. An auscultatory finding that has not been pointed out, or at least, has not been emphasized, has come forcibly to our attention in carrying out this study. Just as the full, deep note or higher pitch characteristically elicited by percussion of the child's chest is often replaced in health by a note more like that produced when one percusses the normal chest of an adult, so, on auscultation of a child's normal lungs, the exaggerated or puerile breath sounds may be lacking, and instead the so-called vesicular respiratory murmur characteristically present in adult life is heard. This finding regarded by us as a physiological variation, has been noted as early as the age of four years and may perhaps occur in younger children. It is more readily appreciated and more often found than the variation in the percussion note just described. In more than 50 per cent. of the children in which this type of breathing was heard, examination with the X-ray gave findings like those obtained by a study of normal adult chests. In fact, the agreement of clinicians and roentgenologists was so constant that we have come on the basis of these variations to designate the chest of normal children as of "puerile" or of

"adult" type. The essential fact to be stressed is that so-called vesicular respiration is heard with great frequency in normal children, and is to be regarded as a variation of normal and not necessarily as an indication of disease.

These variations and those of the percussion note are more generally found in children with a history of infections of the respiratory tract. No satisfactory explanation for this finding is offered. It may be due in part to altered resilience of the chest wall, a suggestion supported by the fact that in some instances in which it was noted, diminished elasticity of the thoracic wall was apparent on percussion. It may stand in relation to variations of elasticity of the parenchyma of the lung. It may be due to a relative narrowing of the lumen of the bronchial tree. It is hardly to be considered evidence of increased density of respiratory tissue, for, theoretically, at least, that should lead to a modification toward bronchial breathing.

Concerning the whispered voice sounds, little comment needs to be made other than to emphasize their loud transmission often with syllabation over the region of the major bronchi. Auscultation of these sounds over the upper thoracic spine of the children has led to the conclusion that D'Espine's sign as indicative of enlarged tracheo-bronchial lymph nodes is, to say the least, of doubtful value. In 23 of the children, this sign was elicited without other signs of a mediastinal mass and without any corroborative evidence on X-ray examination. In 3, the sign could not be elicited, although from the X-ray plate it might have been inferred that it should be. Eustace-Smith's sign is so generally present in normal children that it is of little or no practical diagnostic worth. The presence of these two signs together with impairment of resonance in the interscapular region is all too frequently made the premises for a diagnosis of tuberculosis of tracheo-bronchial lymph nodes. This is unwarranted for, as indicated, these signs are unreliable evidence of a pathological condition and the determination of a diminution of resonance in the interscapular region requires such a nicety of technic that even masters of percussion disagree as to the presence or absence of significant findings in this region of the chest.

A year ago, in the preliminary communication to this society, we stressed the importance of the role that antecedent infections might play in the production of areas of increased density within the respiratory tract. (Bronchial tree, parenchyma of the lungs, etc.) This fact is re-emphasized, for further study has established the importance of it. Not only may recognized or remembered infections of the bronchi and lungs be responsible for alteration in these tissues, but other diseases not ordinarily considered of significance in this regard may be causal of such changes. For example, our observations indicate that after measles, pertussis or tonsillar infections, areas of increased density radiating from the hilum into the bases especially, occur with great frequency. Such lesions generally are not discoverable on physical examination and would be unsuspected but for the use of the X-ray. They are referred to in the clinical part of our joint report in order to point out the need of a careful history as well as examination in all individuals, before proceeding finally to interpret the findings of the roentgenologists. By way of digression, it may be inter-

esting to point out the fact that though measles and pertussis have been known to produce lesions in the upper air passages, involvement of the lower tract has been considered a complication and was thought to occur only when evidence of bronchitis or of broncho-pneumonia were discovered. Our observations indicate that there may be a mild inflammatory process throughout the respiratory passages in a large percentage of the so-called uncomplicated cases of these diseases. This suggestion warrants further study in relation not only to the infections under consideration but also other infectious diseases. That such shadows, mediastinal and basal, noted in children who give a history of uncomplicated measles and pertussis are evidence of healed processes is evidence by the experience that similar shadows of like origin have remained unchanged and without the development of clinical symptoms in a series of children observed from 3 to 5 years. Such changes must be properly evaluated as indices, not of present disease, but of lesions past and healed, not as warrant for the diagnosis of present illness and the institution of treatment, but as scars of infections met and overcome.

Most of the children included in this study were tested with tuberculin—some were given a cutaneous test with old tuberculin (Pirquet)—others were tested by the intracutaneous method. (Craig.)

The foregoing facts have been detailed at some length to establish the major thesis that, clinically, the ideal, normal child is a hypothetical impossibility. Children, apparently healthy, symptom-free and active, show on careful examination many deviations from fixed standards, variations that must be interpreted as within physiological limits; standards of height and weight must be elastic; measures of resonance and of resilience of the chest must not be rigid and estimates of acoustic phenomena must permit of a range of difference from the ideal. These facts, clinical experience establishes beyond peradventure, and they suggest a corollary, namely, that X-ray examination of the chest of such children may be expected to show comparable deviations from a fixed ideal roentgenogram.

The studies reported, fortified by past experience, warrant the following conclusions:

1. The data obtained on percussion and auscultation of the lungs of normal children show wide variations from a fixed standard. These variations are usual and are considered to be within normal limits.
2. Inasmuch as the changes referred to are dependent often upon alterations that persist as the residua of past infections of the respiratory tract, it is obvious that a careful anamnesis, with special reference to all infections, is necessary if diagnostic errors are to be avoided. Even a history carefully taken is often unreliable, as minimal infections are soon forgotten by many and among the unintelligent classes even more significant indispositions are not readily recalled.
3. Failure properly to evaluate these deviations from a fixed standard will often lead to the unwarranted diagnosis of disease and to even less justifiable treatment.
4. With a proper appreciation of the widest variations that the normal may present from the ideal, the informed clinician is better able correctly to understand the findings of the Roentgenologist, and

each, co-operating with the other, is less liable to error.

5. D'Espine's sign as indicative of enlarged tracheo-bronchial lymph nodes is of little value.

6. Recognition of and familiarity with the foregoing data is of cardinal and practical importance to every patient, potential and established. Without a proper appreciation of the fact set forth, no intelligent differentiation between a normal and an abnormal respiratory tract can be made.

In brief, to establish the presence or absence of disease, it is imperative that all data—clinical, laboratory and roentgenographic—must be evaluated and correlated and that no one fraction of the evidence be stressed to the exclusion of the others.

(Signed) C. R. AUSTRIAN,
H. R. M. LANDIS,
KENNETH D. BLACKFAN.

The X-Ray and Clinical Findings in the Normal Chest of the Child

Report of the X-ray division of the committee on medical research of the National Tuberculosis Association.

It is generally conceded that one of the most important factors in accurate interpretation of the appearance of morbid processes in the roentgenogram of the thorax is a thorough familiarity with the normal and variations therefrom within normal limits. With a full realization of this in view the National Tuberculosis Association in 1920 appointed a committee comprising three roentgenologists and three internists to make a study of the normal chest of the child between the ages of six and ten years. This group was instructed to work in co-operation and to make a report of their investigations before the Association when their studies were completed and their conclusions reached. The members selected for the committee were Dr. H. Kennon Dunham of Cincinnati, Dr. Frederick H. Baetjer of Baltimore and Dr. Henry K. Pancoast of Philadelphia to act in the capacity of roentgenologists and to work in co-operation with the respective internists in the same cities, Dr. Kenneth Blackfan, Dr. Charles R. Austrian and Dr. H. R. M. Landis. Each group of two was to work independently until a satisfactory number of individuals were examined and the entire committee was then to meet and draw their conclusions for presentation. It was to be the duty of the internists in each group by careful clinical study to select as nearly normal children as possible for examination by the roentgenologists. The entire procedure was to be carried out with strict co-operation between the two members of each group.

It was soon realized by the X-ray members of the groups that an attempt to describe a normal chest was practically impossible. Their endeavors soon began to center around the description of a theoretical normal with wide variations that would serve as a basis for the interpretation of abnormal appearances and tend to preclude the possibility of erroneous diagnoses being based upon faulty interpretations of hilum shadows, trunk shadows and linear markings more or less altered in appearance by the frequent respiratory infections of children. They realized that herein had existed the greatest source of error in interpretation, and no doubt the Association had this same thought in mind when the committee was appointed to take up these investigations. Errors in interpretations have been made

chiefly in connection with the diagnosis of pulmonary tuberculosis.

It was the consensus of opinion that children are probably more apt to show definite X-ray evidences in the hilum and trunk shadows of simple as well as serious respiratory infections than adults. Practically all children of the ages of those examined have had at one time or another one or more respiratory infections, especially measles and whooping cough, that are likely to produce very apparent changes in the shadows mentioned and which will remain distinctly visible for a variable period of time. These apparent deviations from the normal are not necessarily abnormal when observed, but may be the harmless results of one or more infections. No doubt such appearances have many times been misinterpreted as evidences of tuberculosis. In the conclusions reached by the committee the attempt has been made to preclude this possibility.

Many of the general observations made have not been included in the conclusions. One of those perhaps worth mentioning is the fact that the heart of the child is found to extend relatively further to the right than in the adult.

The thoroughness with which the studies were carried out may be in part realized from the number of individuals examined. Over five hundred children were selected from all strata of life, as stated in the clinical report of the committee.

The groups comprising the committee met at the Phipps Institute, Philadelphia, March 3, 1922. Prior to this meeting there were misgivings as to the possibility of an agreement upon any very definite conclusions, but much to the satisfaction of all the members a definite agreement was reached and the conclusions were completed after a few hours' careful deliberation.

To assist in a better understanding of the conclusions of the committee, a composite diagrammatic reproduction of several roentgenograms was made and is shown in the accompanying illustration. It must be remembered that the three zones like the chest have thickness as well as length and breadth. Thus the zones extend anteriorly and posteriorly from the lung root as well as laterally.

Conclusions of the X-Ray Division of the Committee

The Normal Chest—The normal chest of the child from the roentgenologic standpoint is subject to such wide variations within normal limits as to be beyond the possibility of exact description.

Hilum Shadow—The conglomerate shadow commonly called the hilum shadow, when found lying entirely within the inner third or zone of the lung area can be disregarded (or regarded as normal), except where it is made up of a solid mass of homogeneous shadow giving undoubted evidence that it represents a growth or mediastinal pleurisy.

Calcified Nodes—Calcified nodes at the root of the lung, without evidence of lung disease, are of no significance except as a possible evidence of some healed inflammatory condition, possibly but not necessarily tuberculosis. They are a common finding in normal chests.

Density and Thickness of Trunk Shadows—In the normal lung the bronchial trunk shadows are not visible in the extreme apical regions. For convenience of description the remainder of the lung is divided into three vertical zones, extending outward

from the lateral border of the spinal shadow to the lateral chest border.

The inner zone contains the root shadows.

The mid zone contains the trunk shadows, gradually fading out into their final subdivisions.

The peripheral zone contains radiating lines from these and fading off before the periphery is reached.

Where in the mid zone or peripheral zone, these shadows do not disappear in the characteristic fashion described, the appearance may be evidence of a variety of conditions, past or present, of an inflammatory nature or otherwise. It may accompany a tuberculosis process but it is not necessarily indicative of tuberculosis.

Improper or Misleading Terms—The use of the term "peribronchial tuberculosis" and "parenchyma tuberculosis" is not to be recommended in the interpretation of roentgenograms of the chest. Until corroborated by laboratory or clinical findings, the use of the terms "active" and "quiescent" should not be definitely applied to evident lesions demonstrated on plates.

(Signed) HENRY K. PANCOAST,
KENNON DUNHAM,
F. H. BAETJER.

Correspondence

Dr. Bailey to Mr. Heitman.

To the Editor of THE MEDICAL TIMES:

In your issue of June, 1922, Mr. Charles E. Heitman, of the Christian Science Committee on Publication, has an article headed "An Answer to Dr. Bailey." I would not impugn Mr. Heitman's sincerity for one minute and yet I must say that he has taken a lot of your space (about one and a half columns) to beg the question.

His comparison of Christian Science healers with Jesus on the Mount, and tempted by the devil, is worse than superfluous, it is irreverent. Christian Science healers undertake to heal, and they charge for their time and services, just as medical practitioners do. To say that they must not be questioned as to results of their time and services is astounding arrogance, and, in view of the money they take, it is insolence. Many times, most times, I am inclined to believe, it is adding insult to injury. Imagine a medical practitioner refusing to give some guarantee, or some definite prospect, or hope, after a diagnosis! Imagine him taking money under these conditions and haughtily resenting any questions as to the average results of his methods! And yet the Christian Science healer does all these things, things forbidden to the medical practitioner, and insists upon "getting away with it." And society lets him "get away with it."

I decline to thrash over again the question of mind and allied faculties. My proposition still stands, and it is a proposition that, if made to medical practitioners, concerning their work, would be taken up instantly. It is for Mr. Heitman to produce the evidence of cures of organic diseases by Christian Science methods under the conditions I laid down. If, as he says, it has been done, it can be done again, and surely my conditions would not prevent it from being done again. Play ball, Mr. Heitman!

WILSON G. BAILEY, M.D.

CAMDEN, N. J.

Case of Heart-Block due to Gumma.

A Wassermann test proved very strongly positive. Finally "a provisional diagnosis of gumma of the heart" was arrived at and the patient put upon iodide and inunctions of mercury but without benefit. The signs of cardiac failure increased, fluid accumulated at the lung bases, the liver and spleen became enlarged, breathlessness increased, cough became troublesome, accompanied by blood-stained frothy sputum.

The blood pressure fell to 97 systolic 44 diastolic. The pulse rate varied between 24 and 32. The patient complained of great weariness and thirst and death occurred 18 days from the sudden onset of the symptoms.

Post-mortem confirmed the diagnosis although the actual presence of the treponema pallidum was not demonstrated.—(Med. Jour. South Africa, May, 1921.)

Sedobrol

"Roche"

THE HOT "BROMIDE BROTH"
for

INSOMNIA

MENOPAUSE

NERVOUS AGITATION

NEURASTHENIA

SICKNESS OF PREGNANCY

Each cube contains 17 grains Sodium Bromide, vegetable albumen, and seasoning.



1 or 2 cubes in a cupful of very hot water produces a very palatable broth.

*Sample and Literature
on application*

THE HOFFMANN-LA ROCHE CHEMICAL WORKS
New York

The Management of an Infant's Diet

Diarrhea of Infants

Three recommendations are made—

Stop at once the giving of milk.

Thoroughly clean out the intestinal tract.

Give nourishment composed of food elements capable of being absorbed with minimum digestive effort.

A diet that meets the condition is prepared as follows:

Mellin's Food

4 level tablespoonfuls

Water (boiled, then cooled)

16 fluidounces

Feed small amounts at frequent intervals.

It is further suggested:—As soon as the stools lessen in number and improve in character; gradually build up the diet by substituting one ounce of skimmed milk for one ounce of water until the amount of skimmed milk is equal to the quantity of milk usually given for the age of the infant; also that no milk fat be given until the baby has completely recovered.

Mellin's Food Company, Boston, Mass.

A Vegetable Diastase.

Digestive agents are for emergency use. It would be unfortunate indeed if the manufacturing chemist had to be depended upon permanently for any of the various enzymes that contribute to the conversion of the food into absorbable and assimilable products. But when one of these enzymes or ferments is lacking, a substitute must be supplied or the whole digestive process goes wrong. The ferment most frequently defective is ptyalin. There is always more or less of it, but if it is not present in adequate amount the question arises: How can it be best supplied? or what can be most satisfactorily substituted for it? Instruct the patient to masticate his food; but if the teeth or the salivary glands are out of order we have an indication for Taka-Diastase, an artificial digestive enzyme that will duplicate the work of the ptyalin. A great many physicians are prescribing Taka-Diastase freely. It is a vegetable diastase, capable of liquefying 300 times its weight of cooked starch in ten minutes. It is marketed by Parke, Davis & Co. in tablet, capsule and liquid form. Samples are being offered by the manufacturers.

Dulcets Benzyl Stearate in Bronchial Asthma.

It was Macht, of the Johns Hopkins Medical School, who was studying the so-called "minor" alkaloids of opium, when he found that the benzyl esters relaxed spasm of smooth muscle. Benzyl acetate was too irritating for use and benzyl benzoate was selected for extensive trial as an antispasmodic. It was administered in oil and in alcoholic solutions and elixirs because of its irritating quality and objectionable taste and odor.

Benzyl benzoate was used in over 150 cases of bronchial spasm, or asthma. The cases treated were both adults and children, many of long standing. Benzyl benzoate proved beneficial in about seventy-five percent. of cases. A number did not react at all. Where the dyspnea is due to causes other than bronchial spasm the benzyl benzoate can be of little use.

Dulcets Benzyl Stearate are chocolate squares, palatable as candy, each square containing 15 grains benzyl stearate. This product has the complete action of benzyl benzoate, in addition to the advantage of being odorless and tasteless. It is made only by Eli Lilly and Company.

A New Correspondence Course Offered to Public Health Nurses

The State Department of Health announces that in co-operation with the New York University and Bellevue Hospital Medical College in New York City arrangements have been made to conduct a correspondence course for the training of public health nurses. This course, which is open to all registered nurses, will begin on September 5th, 1922, and will call for ten hours weekly study for a period of forty-eight weeks. The course will include instruction in all of the various phases of public health work in which nurses are engaged, and will cover such topics as maternity and child hygiene, communicable diseases and bacteriology, vital statistics, community and home hygiene and sanitation, industrial hygiene, occupational diseases, mental hygiene, and the principles of community organization and administration, from the point of view of both public and private agencies. In the latter part of the course a week of study in residence at either New York City, Buffalo, Syracuse or Albany will be required. A certificate will be given on completion of the course, and a matriculation fee of five dollars represents the entire expense of the course to the student, outside of living expenses during the week of residence work, and the purchase of the necessary text books.

The State Commissioner of Health, Dr. Hermann M. Biggs, has long noted with regret the lack of a sufficient number of qualified public health nurses to meet the demands of communities and private organizations desiring to employ these invaluable aids to the up-to-date health officer. Since the Department has for some years conducted a successful correspondence course for health officers it seemed wise to try the experiment of a similar course for nurses, in order to add to the number of graduate nurses who should be widely informed on all phases of the public health nursing work now being carried on in New York State. In particular it is hoped by this means to increase the number of women qualified for paid positions in the health service of the State.

Mock modesty is a social disease more deadly than any disease known. It places a premium on ignorance and condemns measures which, if put into practice, would guarantee knowledge of self to the growing youth and girl which would make them more wholesome. Mock modest persons are usually nasty-minded and are unfit to train children.—LEE A. STONE, M.D.

CHLORYLEN

(Trichlor Ethylene in its purest form)

Liquid in bottles of 25 grams each.

A new treatment for Facial Neuralgia.

Chlorylen is used with marked success in the treatment of Facial Neuralgia. It has a specific action on the sensitive Trigemini, gives immediate relief and the pain disappears after a few treatments.

Chlorylen is applied by inhalation. 20 to 30 drops are placed on cotton or the handkerchief and inhaled through the nostrils until the odor disappears.

NOVARTAMIN

(Phenyl-Quinolin-Di-Carboxylic Acid)

In tablets.

Indications: Gout, Rheumatism, Neuralgia, Neuritis, etc., eliminating Uric Acid without causing gastric disturbances. No disagreeable taste.

Dose: One to two tablets three to four times after meals dissolved in a little water followed by a large glass of water.

NEUTRALON

(Synthetic Aluminum Silicate)

Indications: Hyperchlorhydria, Hypersecretion, Ulcus Ventriculi and Duodeni.

A neutral and yet neutralizing substitute for the Bismuth Salts, Sodium Bicarbonate and Silver Compounds, etc. It reacts gradually and its effect is more permanent than that of the Alkalies and of Magnesia. A white, tasteless, odorless powder.

The average dose is one teaspoonful in a glass of water, (preferably warm) a half hour before food.

VALAMIN

(Amylene-Hydrate Iso-Valeric-Ester)

In capsules.

A sedative and soporific, easily absorbed and promptly acting.

Indications: Neurasthenia, Nervous Insomnia, Hysteria, Palpitation of the Heart, etc.

Dose: As a Sedative one to two capsules, as a Hypnotic two to four capsules followed by a drink of water. In nervous insomnia two to four capsules should be taken before retiring.

For further information and literature address

KIRBACH, INC.

General Agents

227-229 Fulton St., N. Y.



"Why Take a Chance, When You May Be Sure, in Treating Thyroid Insufficiency?"

The most recent method of treating Thyroid Insufficiency is to administer two-grain doses of **Standardized Thyroid** t.i.d. until the usual symptoms of hyperthyroidism appear; then give small doses, [1/10 or 1/4 grain] to maintain balance.

The Armour Thyroid Preparations are *stable* and dependable. They are standardized for *iodine* content and run

uniformly.

The Armour Thyroid Products represent all the therapeutic properties of normal Thyroid glands unimpaired, as all desiccating is done in vacuum ovens at a temperature never above 105 degrees F.

We offer Thyroid Powder and 1/10, 1/4, 1/2, 1 and 2 grain compressed tablets. *Also*

Suprarenalin Solution	1:1000
Suprarenalin Ointment	1:1000
Pituitary Liquid	1/2 c.c. "O & S"
Pituitary Liquid	1 c.c. "S & O"

Armour's Sterile Catgut Ligatures are made from selected lambs gut—plain, chromic and iodized; 000 to number 4

Literature to Physicians on request

ARMOUR AND COMPANY

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LISTERINE

A Non-Poisonous, Unirritating Antiseptic Solution

Agreeable and satisfactory alike to the Physician, Surgeon, Nurse and Patient. Listerine has a wide field of usefulness and its unvarying quality assures like results under like conditions.

As a wash and dressing for wounds

As a deodorizing, antiseptic lotion

As a gargle, spray or douche

As a mouth-wash-dentifrice

Operative or accidental wounds heal rapidly under a Listerine dressing, as its action does not interfere with the natural reparative processes.

The freedom of Listerine from possibility of poisonous effect is a distinct advantage, and especially so when the preparation is prescribed for employment in the home.

LAMBERT PHARMACAL COMPANY

ST. LOUIS, MO., U. S. A.

A New Benzyl Compound

Since Dr. David T. Macht brought benzyl benzoate forward, the research chemists of The Abbott Laboratories have been investigating a number of other benzyl compounds. For effectiveness, Benzyl Fumarate was found to surpass them all. Besides, it has the advantage of being a practically tasteless solid, easily made into tablets. Nor is it likely to set up epigastric distress. As an antispasmodic, it is more effective than either the benzoate, the stearate, the cinnamate or the succinate in the same or smaller doses. It may be had in 5-grain tablets.

This represents a signal advance in the therapy. With Benzyl Fumarate, better results may be expected, surer relief obtained in conditions of pain, dyspnea and looseness of the bowels due to spasm of involuntary muscle, as of the uterus, the bronchial rings and the intestines. The fact that the drug is practically harmless is, furthermore, a good point in its favor. A new leaflet on Benzyl Fumarate may be obtained by writing to The Abbott Laboratories, Chicago.

How the State is Restoring Crippled Children to Health

Have you ever seen a small boy or girl limping along the street on a crutch, with one leg shrunken and useless? Perhaps you have wondered what could have happened to turn a romping happy child into such a cripple. Such cases are almost always due to the disease known as infantile paralysis or as the doctors call it "Poliomyelitis."

While we have not had an epidemic of this disease since 1916, there were more cases than usual last summer and it is well for us to know more about it. Infantile paralysis occurs at all times of the year, but is more in common in summer than in winter. It is caused by a germ which attacks the spinal cord. It is an infectious disease and is supposed to be spread from person to person in much the same manner as common colds. The usual symptoms in the beginning such as fever, headache, and vomiting are like those of several other infectious diseases. In addition there may be pain and stiffness in the back of the neck. Often it is thought to be an attack of stomach trouble. While the symptoms described may be those of acute indigestion, it is better to be on the same side and call a physician. Not all cases of the disease become paralyzed. When paralysis does occur it usually comes on within a week of the first symptom. Any child showing any of the symptoms named should be kept away from all other children, until the nature of the disease is determined by a physician.

Whether a person becomes crippled by infantile paralysis depends very largely upon the early treatment and care. A long period of rest and quiet is needed. As soon as the early symptoms have disappeared the advice of a surgeon specially trained in this disease is desirable. The State Department of Health employs such a surgeon and he is available for consultation with the family physician in all cases. It also employs nurses especially trained in the care of this disease. These nurses live in different parts of the State and their services are available to everyone in New York State. Few people realize that since the great epidemic of 1916 more than 5,000 patients have been under the supervision of the New York Health authorities and many have been so helped that they are able to walk, run and use their arms like other people. Others affected before 1916, who for many years have been helpless cripples, have been restored to at least partial usefulness by means of hospital care and operation. If you know of any persons suffering from the effects of this disease who are not receiving care, write to the State Department of Health, Albany, N. Y.—Dr. Hermann M. Biggs, New York State Commissioner of Health, in *Radio Health Hints*.

Congestive Dysmenorrhea

Dr. F. H. Davenport, A.B., M.D., Assistant in Gynecology, Harvard Medical School, in his book on "Disease of Women" and under the above caption refers to the treatment of congestive dysmenorrhea and the use of anodynes. He says, "It is by all means wisdom to avoid in these cases, if possible, all the use of stronger sedatives and anodynes."

In referring to the use of medication in these cases, Dr. Davenport, in this most excellent work on "Non-Surgical Gynecology," says: "Hayden's Viburnum Compound has seemed to be the most effectual remedy of this class, given in hourly teaspoonful doses in hot water, for five or six times."

That Hayden's Viburnum Compound is of inestimable value in the treatment of dysmenorrhea is not only indicated by its employment of gynecologists of today, but in the past by no less an authority than J. Marion Sims, who prescribed it and recommended its employment.

Hayden's Viburnum Compound is not a narcotic and contains no habit-forming drugs. It is a product of known composition and as a uterine sedative it holds first place in the opinion of many physicians as not only a dependable therapeutic product, but a remedy which is safe to administer to their patients. Given in teaspoonful doses, administered in hot water, it will prove most

effective. Samples on request to New York Pharmaceutical Co., Bedford Springs, Mass.

Relief for Hay Fever at Home

Those who have suffered year after year from hay fever, "Rose colds," asthma and similar afflictions will welcome the information that in a large number of instances it is possible greatly to relieve the symptoms and sometimes to cure these diseases permanently without going away from home, says Dr. Hermann M. Biggs, New York State Commissioner of Health, in one of his radio health hint broadcasts.

Before discussing the method of treatment we should first consider some of the causes of hay fever. True hay fever is due to a peculiar sensitiveness on the part of some persons to the pollens of certain grasses, weeds, plants or trees. Formerly, it was supposed that the pollen of the golden rod and rag weed were alone the cause of hay fever but now we know that while these two cause some cases many other pollens are also to blame. The earliest group of cases of true hay fever develop in April, are very few in number, and are due to the pollen of certain trees such as the birch and maple. The next group appears by the middle or end of May and lasts until mid-July, while late hay fever begins in mid-August and lasts until frost. The pollen of the different grasses is responsible for a great majority of the cases. The pollen of roses and golden rod is heavy and therefore not being widely scattered causes few cases. Occasional cases are caused by the pollen of daisies, asters, sweet clover, corn and far less often by that of other flowers and plants.

What has been said applies to hay fever that occurs only at stated periods of the year. Many cases called hay fever that occur at odd times throughout the year and certain types of asthma are due either to the presence of adenoids or other nose obstructions. Such cases may also result from the sensitiveness of those persons to certain substances such as dandruff from horses, dogs, cats or other animals, dust from feathers used in pillows, hair used in mattresses, etc., cotton, insecticide powders and orris root used in talcum powders. Asthma may also be caused by the use of certain foods to which these particular persons are sensitive. Eggs, strawberries and some of the cereals sometimes causes this trouble.

In hay fever coming at practically the same time each year, a fairly accurate guess as to the cause can often be made by noting the particular grass or weed or flower pollen most common at that time. In hay fever or asthma occurring at odd times during the year it is wise first of all to have a competent physician examine the throat and nose for any obstruction in the upper air passages. If none can be found there, it should be noted whether the attack is preceded by contact with certain animals, absence of which gives relief. It should next be noted whether the patient is free from symptoms when away from home. If so, then experiments should be tried to determine the exact cause by substituting hair for feather pillows, cotton for hair mattresses, etc. Women and girls afflicted with either hay fever or asthma should be careful not to use talcum powders containing orris root. Note should also be made as to whether the symptoms always appear after eating certain foods, such as those previously mentioned and others known to affect some persons unfavorably.

If these simple tests all fail, a physician can oftentimes decide definitely by inoculating into the skin of the arm minute amounts of a sterile extract of each of the pollens and other substances—considered capable of producing the symptoms. No discomfort is felt until the substance actually causing the trouble is injected when a slight swelling, reddening and itching occurs. Once the right substance is thus detected relief from the affliction can usually be obtained by weekly inoculations of increasing doses of an extract of the substance in question, thus causing the body to manufacture its own antidote.

Smithsonian Institution to House Public Health Exhibit

The National Committee on Exhibits Showing Advances in Sanitary Science has recently been formed in Washington, D. C., for the purpose of collecting and preparing material for a great popular public health exhibit in the Capitol. The members of the committee include:

Surgeon General H. S. Cumming, U. S. Public Health Service, Chairman.

Dr. D. B. Armstrong, National Health Council.

Miss Mabel T. Boardman, American Red Cross.

Surgeon General M. W. Ireland, U. S. Army Medical Corps.

Dr. Victor C. Vaughan, National Research Council.

Dr. C. D. Walcott, Smithsonian Institution.

James A. Tobey, National Health Council, Secretary.

Space for the proposed exhibit has been placed at the disposal of the Committee by the Smithsonian Institution, which is visited by more than half a million persons annually. Plans are under way to install exhibit material secured from official and voluntary health agencies. The secretary's office is in the national headquarters of the American Red Cross at Washington, D. C.

The control of
Rheumatic Pain
by the application of

K-Y ANALGESIC

("The Greaseless Anodyne")

will be found a valuable adjunct to your internal treatment. Repeat as often as necessary. Always wash off previous application

**Headache
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**In Your Bag
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are three places where a bottle of

SYNOL SOAP

should always be kept, assuring yourself of a thorough cleansing of your hands before and after examinations. Synol Soap is antiseptic, cleansing and emollient.

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**Effective
Surgical Lubrication**

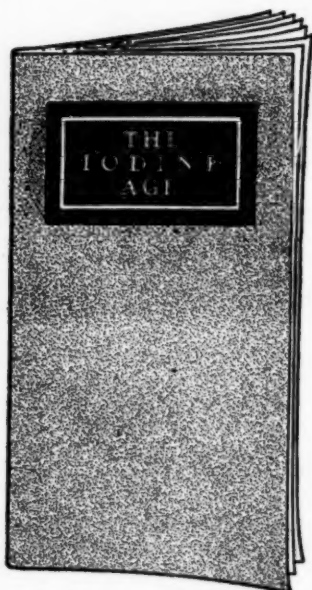
is assured by the use of

K-Y LUBRICATING JELLY

Contains no grease, soluble in water, easily removed, does not stain the skin or clothing. Non-irritating, soothing and emollient.

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The Therapeutic Value of Iodine



If you have not had a copy,
send for one today.

is recognized today as never before. With many physicians this has been due to the fact that through the use of

BURNHAM'S SOLUBLE IODINE

they have been able to administer a free and active iodine in adequate dosage, and for sufficiently long and continuous periods to produce the results desired—and with notable freedom from disagreeable or deleterious effects.

Because of the foregoing, Burnham's Soluble Iodine has been found by many medical men an exceptionally valuable remedy—often a life-saver—in the treatment of the acute septic infections, notably pneumonia, influenza, empyema, septic sore throat, quinsy, septicemia, peritonitis, and countless other grave diseases.

An interesting brochure on "The Iodine Age" has been issued recently, giving treatment and dosage directions that make it invaluable to those seeking fullest benefits from iodine-therapy. A copy will be sent on request to

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THE WALLEASY ARTIFICIAL LEG
combines all the latest improvements in modern Artificial Limb construction. Our free Art Catalogue contains valuable information relative to points of amputation, care of stump and limbs for children.

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1233 Arch St.

Alkalol in Summer

The summer season brings with it a number of physical annoyances, not to say ailments, which react most unfavorably upon the mental condition, and which frequently send the sufferer to the physician in search of relief.

A nasal mucous membrane that is at all sensitive responds quickly to the irritation produced by dust, the pollen of plants, and even those variations in temperature and atmospheric pressure that characterize the heated term.

The agent, par excellence, which brings about prompt relief and maintains constant comfort in such cases, is Alkalol; what is true of the nose, is also true of the throat, in which Alkalol is equally effective. Irritations and inflammations of the conjunctiva or inflammation of the external auditory canal promptly yields to Alkalol.

Even more effective is its action upon a skin irritation, whether the latter be caused by solar heat, windburn, insect bites or stings, or chafing.

The physician who recommends the use of Alkalol as a vaginal douche can depend upon arousing the gratitude of the patient.

In short, Alkalol is an all round, comfort insurance. It is specifically designed for use upon mucous membranes, which means that its physiological salt content has been most carefully selected. Its alkalinity and salinity, properly worked out and its specific gravity made hypotonic, all of which means that Alkalol feeds depleted or exhausted cells. Does not favor or produce hypersecretion and is soothing and healing to a degree.

Another very useful purpose which Alkalol serves is as an antacid and antifermentative for internal use in the gastro-intestinal disturbance during the summer.

There is no excuse for not knowing Alkalol. A post card to the Alkalol Company, Taunton, Mass., will bring sample and interesting literature.

A Stand-By in Uterine Troubles VIBURNO

(BEACH)

The best evidence of this is the repeat orders received from physicians and druggists.

Nervine-Tonic and Anticongestive, with calmative and corrective action on the bladder. Employed with much satisfaction in ovarian congestion and congestive dysmenorrhea; weak pregnancy and deficient lactation; menopause and its phenomena, including hallucinations, hot flushes, etc.; nervous and menstrual derangements after "flu," and the troubles of adolescent girls. Sterility often responds after 2 or 3 bottles if no lesion exists.

Unlike similar products, VIBURNO is palatable and pleasant to take. Dose: 2 teasp. (undiluted) t.i.d. before meals.

Put up in 11 oz. bottles

Sample and Formula on Request.

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